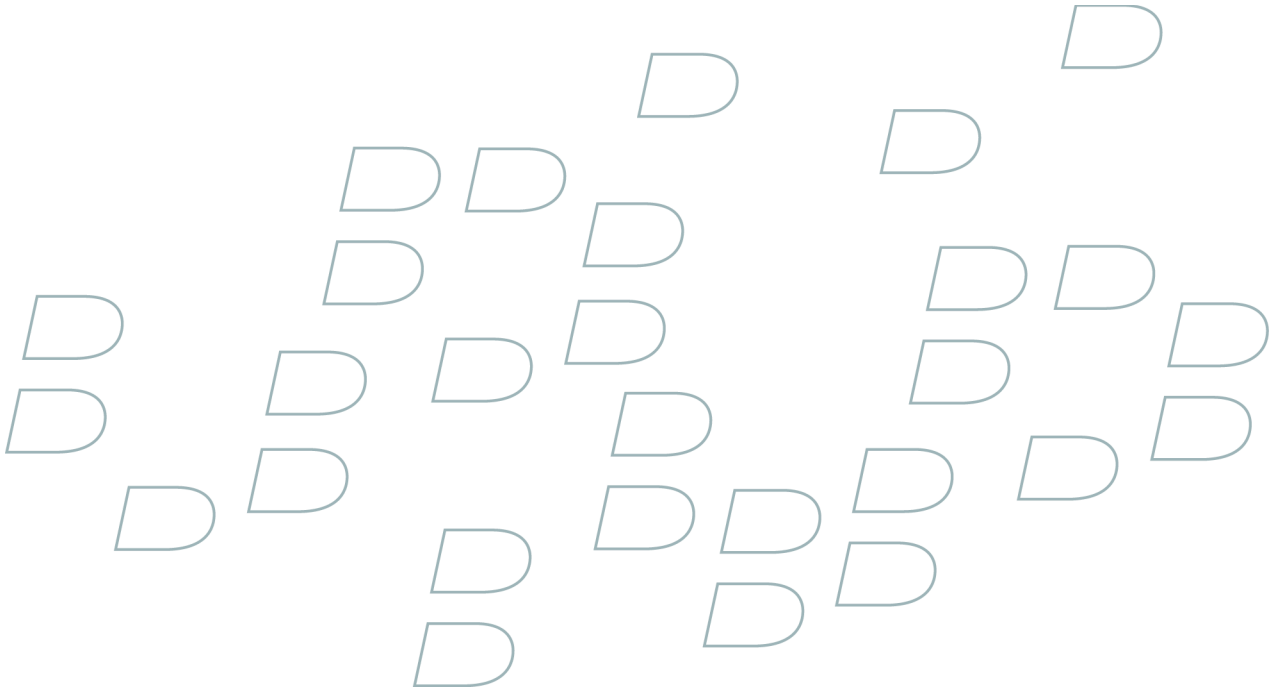

Feature and Technical Overview

BlackBerry Enterprise Server for Microsoft Exchange

Version: 4.1 | Service Pack: 6

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New in this release 1

Feature	Description
Rich-content email messages	BlackBerry® Enterprise Server version 4.1 SP6 supports HTML and rich-content email messages for BlackBerry devices that are running BlackBerry® Device Software version 4.5 or later. By default, this feature is turned on. For more information about the impact of supporting HTML email messages and rich-content email messages on CPU resources, visit www.blackberry.com/go/serverdocs to see the *Impact of supporting HTML and RTF email messages* document. The BlackBerry Enterprise Server and its components support HTML email messages in a Japanese environment when the following options are selected in the regional and language settings of the computer: Install files for complex script and right-to-left languages, and Install files for East Asian languages.
Changes to the BlackBerry Configuration Database schema	BlackBerry Enterprise Server version 4.1 SP6 contains changes to the BlackBerry Configuration Database schema. The changes occur in the upgrade file that is named UpgradeV20080410.sql.
Support for Microsoft® Office Communications Server 2007	The BlackBerry Collaboration Service supports Microsoft Office Communications Server 2007. BlackBerry Enterprise Server version 4.1 SP6 supports a new collaboration client for use with this instant messaging server: the BlackBerry® Client for use with Microsoft® Office Communications Server 2007.
Support for IBM® Lotus® Sametime® version 8.0	The BlackBerry Collaboration Service supports IBM Lotus Sametime version 8.0.
New names for the BlackBerry collaboration clients	The collaboration client that was previously named BlackBerry® Instant Messaging for Microsoft® Office Live Communications Server 2005 is now named the BlackBerry® Client for use with Microsoft® Office Live Communications Server 2005. The collaboration client that was previously named BlackBerry® Instant Messaging for IBM® Lotus® Sametime® is now named the BlackBerry® Client for IBM® Lotus® Sametime®.

Feature	Description
	The collaboration client that was previously named BlackBerry® Instant Messaging for Novell® GroupWise® Messenger is now named the BlackBerry® Client for Novell® GroupWise® Messenger.
Control RIM value-added applications	You can use new and existing IT policy rules to control RIM value-added applications. For more information about new IT policy rules, see the *Policy Reference Guide*.
Improved reconciliation of permanently deleted messages	BlackBerry Enterprise Server versions 4.1 and later support the reconciliation of permanently deleted messages from Microsoft® Outlook®. If users permanently delete messages in Microsoft Outlook (using SHIFT+DELETE) or archive messages in personal folders, the messages are deleted from the users' BlackBerry devices. BlackBerry Enterprise Server version 4.1 SP6 includes improvements for the reconciliation of permanently deleted messages. This feature uses a message state database that is stored in the memory of the BlackBerry Messaging Agent. The message state database is used to associate messages on your organization's messaging server with messages on the BlackBerry devices of users in your organization. In previous releases of the BlackBerry Enterprise Server, the size of the message state database determined how many permanently deleted messages could be reconciled for each user. In BlackBerry Enterprise Server version 4.1 SP6, the BlackBerry Messaging Agent uses recurring message scans to detect permanently deleted messages on the messaging server and delete them from the users' BlackBerry devices. The size of the message state database no longer limits how many permanently deleted messages the BlackBerry Messaging Agent can reconcile for each user. By default, on the BlackBerry Enterprise Server, reconciliation for permanently deleted messages is turned off. You can turn on this feature using the BlackBerry Manager. When reconciliation for permanently deleted messages is turned on, the BlackBerry Messaging Agent uses approximately 64 x *N* bytes of additional memory for each user on the computer that hosts the BlackBerry Messaging Agent, where *N* represents the number of records in the message state database.

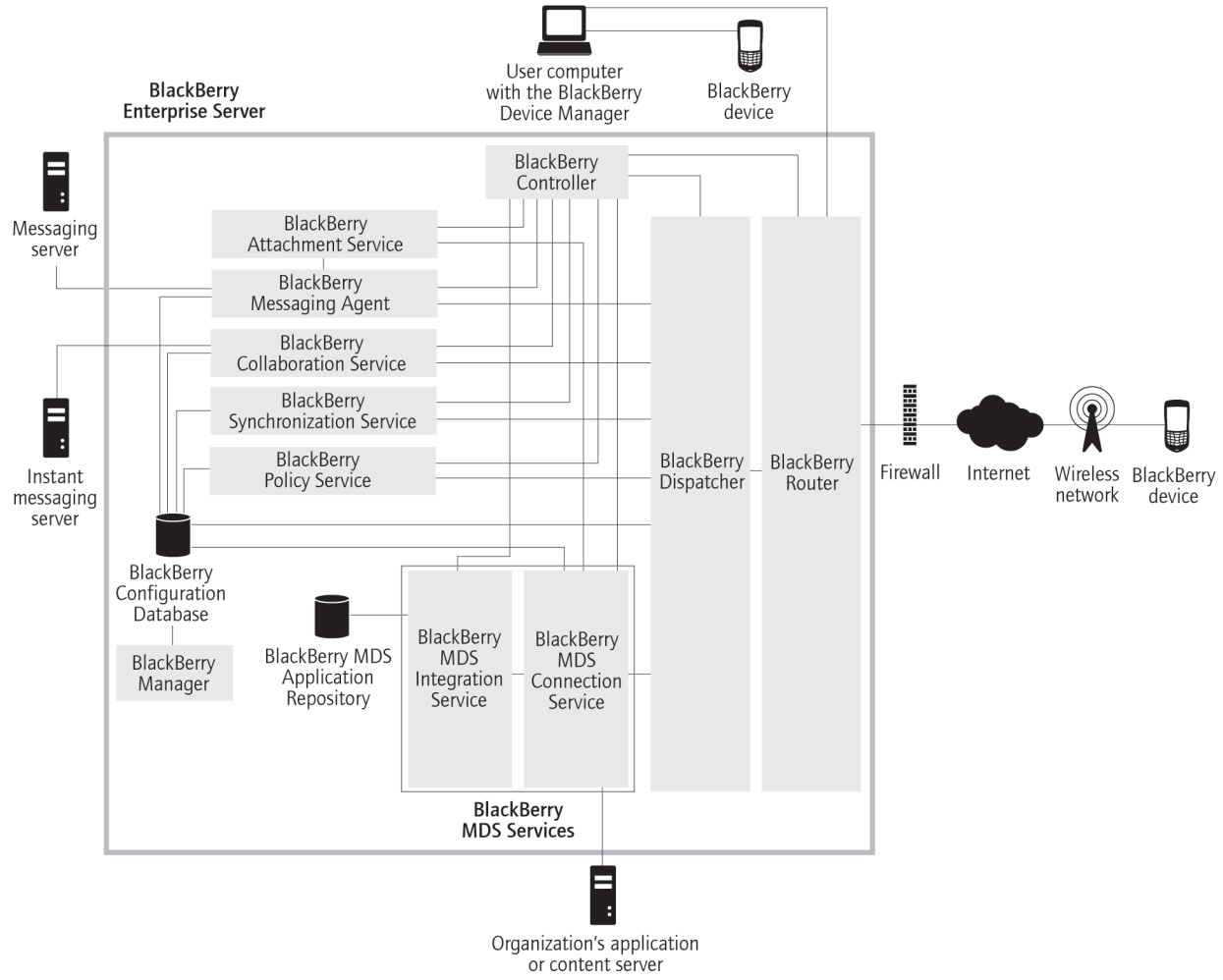
Feature	Description
	For example, if an organization's environment has 2000 users and 100 records in the message state database, the computer that hosts the BlackBerry Messaging Agent uses 12.2 MB of additional memory.
New naming conventions for the BlackBerry® Mobile Data System and related software	The component of the BlackBerry Enterprise Server that was previously named the BlackBerry MDS Services is now named the BlackBerry MDS Integration Service. The term BlackBerry MDS Services now refers collectively to the BlackBerry MDS Integration Service and the BlackBerry MDS Connection Service. BlackBerry® MDS Studio Applications are now named BlackBerry® MDS Runtime Applications. Java® applications that are developed for and used on BlackBerry devices are now named BlackBerry Java Applications. Browser applications that are developed for and used on BlackBerry devices are now named BlackBerry® Browser Applications. The term BlackBerry Applications refers collectively to BlackBerry MDS Runtime Applications, BlackBerry Java Applications, and BlackBerry Browser Applications. The BlackBerry Manager UI and the BlackBerry Enterprise Server documentation reflect these new naming conventions.

BlackBerry Enterprise Server architecture 2

Architecture: BlackBerry Enterprise Server

The BlackBerry® Enterprise Server consists of various components that are designed to perform the following actions:

- provide productivity tools and data from an organization's applications to its BlackBerry device users
- monitor other BlackBerry Enterprise Server components
- process, route, compress, and encrypt data
- communicate with the wireless network



Component	Description
BlackBerry Attachment Service	The BlackBerry Attachment Service converts supported message attachments into a format that users can view on their BlackBerry devices.
BlackBerry Collaboration Service	The BlackBerry Collaboration Service provides a connection between your organization's instant messaging server and the enterprise instant messaging application on BlackBerry devices.

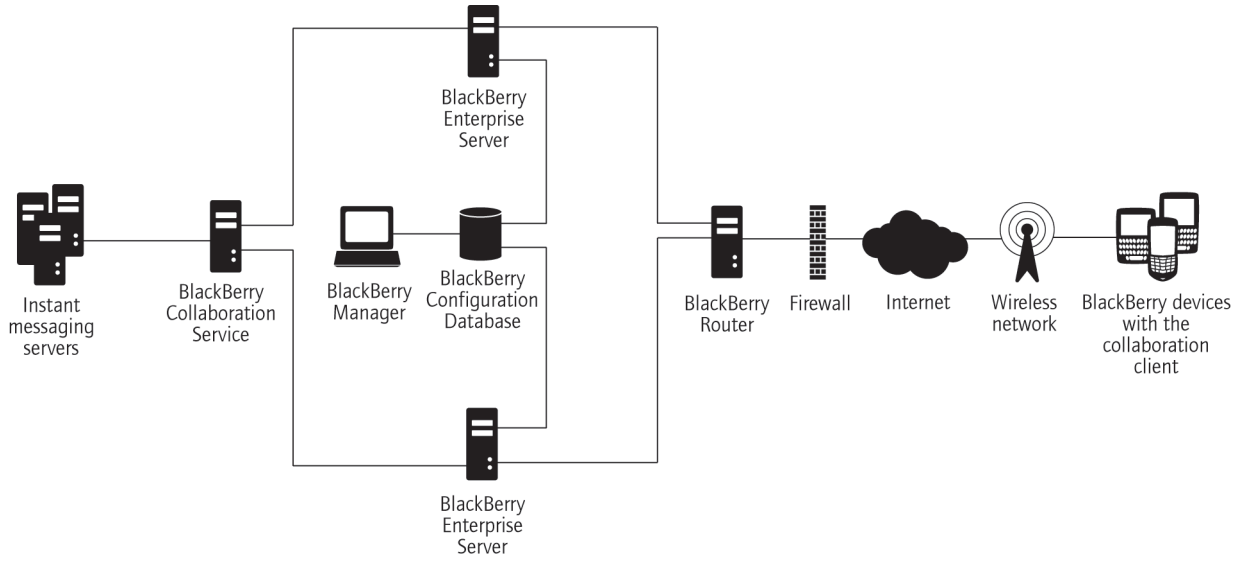
Component	Description
BlackBerry Configuration Database	The BlackBerry Configuration Database is a relational database that contains configuration data that BlackBerry Enterprise Server components use. The BlackBerry Configuration Database includes the following data: • details about the connection from the BlackBerry Enterprise Server to the wireless network • user list • address mappings between PINs and email addresses for BlackBerry MDS Connection Service push features • read-only copy of each master encryption key
BlackBerry Controller	The BlackBerry Controller monitors the BlackBerry Enterprise Server components and restarts them if they stop responding.
BlackBerry Dispatcher	The BlackBerry Dispatcher compresses and encrypts all of the data that is sent to and from BlackBerry devices. It sends the data through the BlackBerry Router, to and from the wireless network.
BlackBerry Manager	The BlackBerry Manager connects to the BlackBerry Configuration Database. You can use the BlackBerry Manager to manage the BlackBerry Domain, including user accounts and device administration. The BlackBerry Domain consists of a single BlackBerry Configuration Database and all the BlackBerry Enterprise Server instances that use it.
BlackBerry MDS Connection Service	The BlackBerry MDS Connection Service enables users to access web content, the Internet, or your organization's intranet, and also enables applications on BlackBerry devices to connect to your organization's application or content servers for application data and updates.
BlackBerry MDS Integration Service	The BlackBerry MDS Integration Service provides application-level integration for BlackBerry® MDS Runtime Applications on BlackBerry devices. You can use the BlackBerry MDS Integration Service to install BlackBerry MDS Runtime Applications that are stored in the BlackBerry MDS Application Repository on BlackBerry devices. You can also use it to manage, update, and remove BlackBerry MDS Runtime Applications.
BlackBerry MDS Application Repository	The BlackBerry MDS Application Repository stores BlackBerry MDS Runtime Applications that your organization's developers can create and publish using the BlackBerry® MDS Studio or the BlackBerry® Plug-in for Microsoft® Visual

Component	Description
	Studio® developer tools. You can use the BlackBerry Manager to manage the BlackBerry MDS Runtime Applications that are stored in the BlackBerry MDS Application Repository.
BlackBerry Messaging Agent	The BlackBerry Messaging Agent connects to your organization's messaging server to provide messaging services, calendar management, address lookups, attachment viewing, attachment downloading, and encryption key generation. The BlackBerry Messaging Agent also acts as a gateway for the BlackBerry Synchronization Service to access organizer data on the messaging server. The BlackBerry Messaging Agent synchronizes configuration data between the BlackBerry Configuration Database and user mailboxes.
BlackBerry Policy Service	The BlackBerry Policy Service performs administration services over the wireless network. It sends IT policies and IT administration commands and provisions service books. IT policies and IT administration commands define BlackBerry device security, settings for synchronizing data over the wireless network, and other configuration settings on BlackBerry devices. The BlackBerry Policy Service also sends service books to configure feature and component settings on BlackBerry devices.
BlackBerry Router	The BlackBerry Router connects to the wireless network to send data to and from BlackBerry devices. It also sends data within your organization's network to BlackBerry devices that are connected to computers with the BlackBerry® Device Manager.
BlackBerry Synchronization Service	The BlackBerry Synchronization Service synchronizes organizer data between BlackBerry devices and the messaging server over the wireless network.
organization's application or content server	The organization's application or content server provides push applications and intranet content for the BlackBerry MDS Services.
instant messaging server	The instant messaging server stores instant messaging accounts.
messaging server	The messaging server stores email accounts.
user's computer with the BlackBerry Device Manager	The user's computer with the BlackBerry Device Manager enables users to connect their BlackBerry devices to their computers using a serial or USB connection. The BlackBerry Enterprise Server and BlackBerry devices use this connection to send data between them.

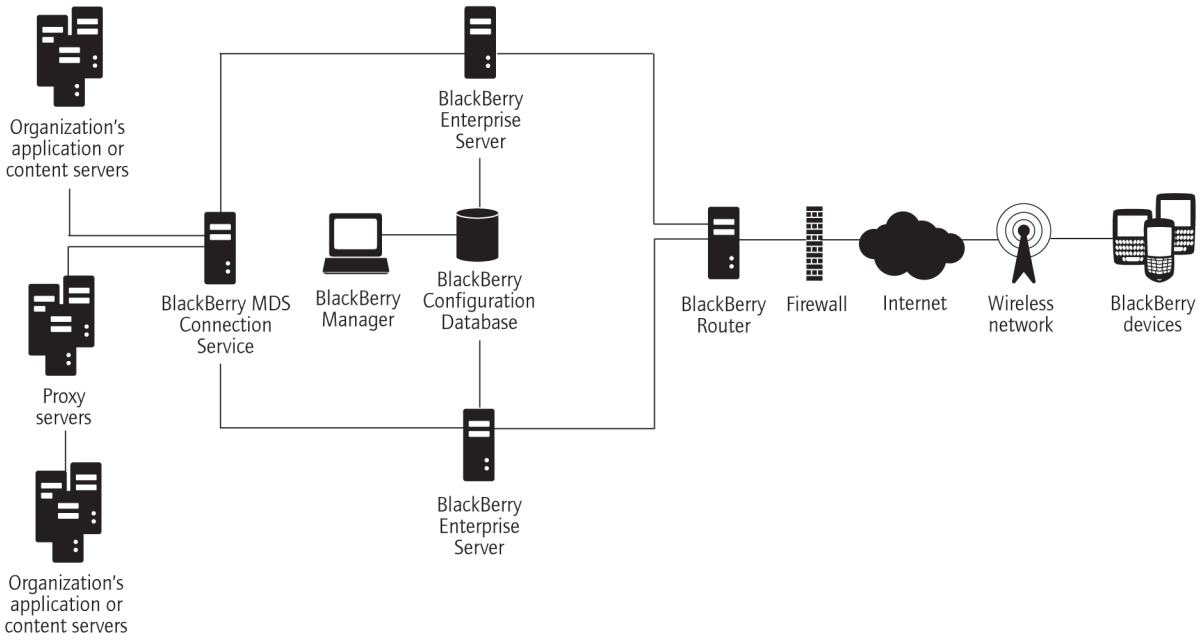
Component	Description
	Data traffic from BlackBerry devices bypasses the wireless network while BlackBerry devices are connected to users' computers. The BlackBerry Device Manager connects to the BlackBerry Router, which sends data directly to BlackBerry devices. Users can install the BlackBerry Device Manager separately from the BlackBerry® Desktop Manager or with it as part of the full BlackBerry® Desktop Software installation. The BlackBerry Device Manager is an optional component, but it is required to support a bypass connection to the BlackBerry Router.

Architecture: BlackBerry Enterprise Server remote components

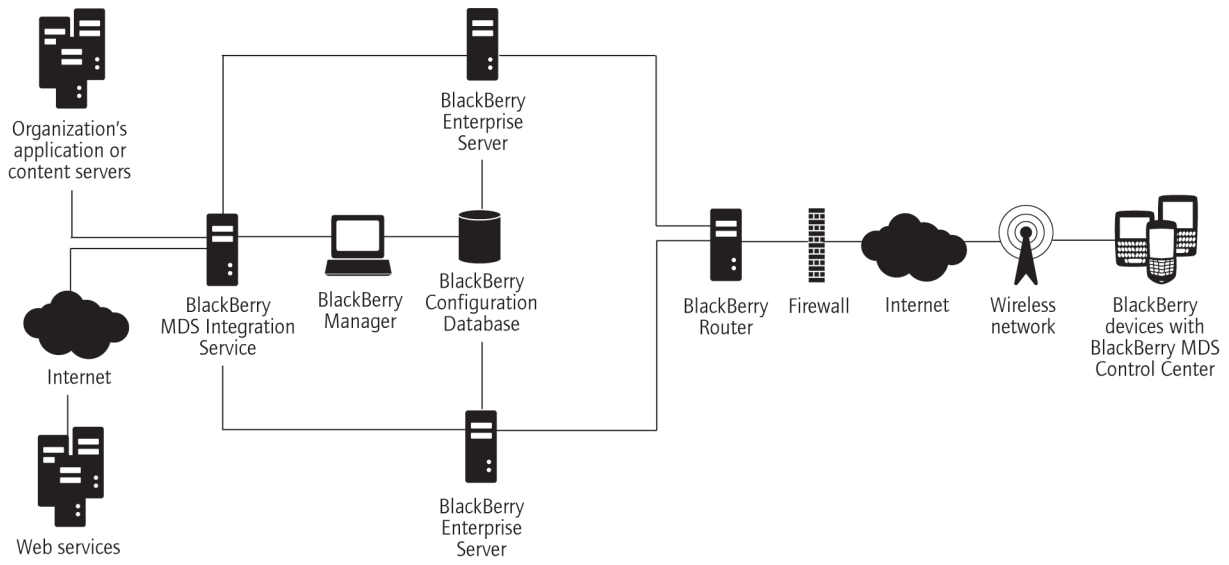
You can install all BlackBerry® Enterprise Server components on one computer, or you can install certain components on separate computers. Different components impact system resources differently. You can choose to install only one remote component on each computer in your organization's environment.



Sample architecture with a remote BlackBerry Collaboration Service



Sample architecture with a remote BlackBerry MDS Connection Service



Sample architecture with a remote BlackBerry MDS Integration Service

Component	Description
BlackBerry Manager	A remote BlackBerry Manager enables you to manage the BlackBerry Domain from their computers.
BlackBerry Attachment Service	A remote BlackBerry Attachment Service can support multiple BlackBerry Enterprise Server instances. The BlackBerry Attachment Service can use increased system resources when it processes concurrent conversion requests. You can install the BlackBerry Attachment Service on a remote computer to increase the number of concurrent conversions without impacting message delivery.
BlackBerry Collaboration Service	A remote BlackBerry Collaboration Service can support multiple BlackBerry Enterprise Server instances. The BlackBerry Collaboration Service uses a persistent socket connection for each instant messaging session. You can install the BlackBerry Collaboration Service on a remote computer to maximize the number of available sockets.

Component	Description
	You can install only one type of BlackBerry Collaboration Service (for example, IBM® Lotus® Sametime®), and users can use only one type of enterprise instant messaging application on their BlackBerry devices.
BlackBerry MDS Connection Service	A remote BlackBerry MDS Connection Service can support multiple BlackBerry Enterprise Server instances. The BlackBerry MDS Connection Service can use increased system resources when it processes content requests. You can install the BlackBerry MDS Connection Service on a remote computer to minimize the impact on message and data delivery.
BlackBerry MDS Integration Service	A remote instance of the BlackBerry MDS Integration Service can support multiple BlackBerry Enterprise Server instances and one BlackBerry MDS Application Repository. The BlackBerry MDS Integration Service can use increased system resources when processing content requests. You can install a BlackBerry MDS Integration Service on a remote computer to minimize the impact on message delivery.
BlackBerry MDS Application Repository	A remote BlackBerry MDS Application Repository can support one instance of the BlackBerry MDS Integration Service. You must install the BlackBerry MDS Application Repository on the same database server as the BlackBerry Configuration Database.
BlackBerry Router	A remote BlackBerry Router can support multiple BlackBerry Enterprise Server instances. The BlackBerry Router does not use many system resources, but it is a critical connection point for the BlackBerry® Enterprise Solution. You can install multiple standby instances of the BlackBerry Router as failover locations in the event that the active BlackBerry Router is unavailable.
BlackBerry Configuration Database	A remote BlackBerry Configuration Database can support multiple BlackBerry Enterprise Server instances, which creates a BlackBerry Domain.

BlackBerry Enterprise Server components and features 3

BlackBerry messaging and collaboration services

The BlackBerry® messaging and collaboration services provide a wireless extension of an organization's messaging environment. These services include the BlackBerry Messaging Agent, the BlackBerry Collaboration Service, the BlackBerry Synchronization Service, and the BlackBerry Attachment Service.

BlackBerry Messaging Agent

The BlackBerry® Messaging Agent connects to an organization's messaging server and provides messaging services, calendar management, address lookups, attachment viewing, attachment downloading, and encryption key generation. The BlackBerry Messaging Agent also acts as a gateway for the BlackBerry Synchronization Service to access organizer data on the messaging server. The BlackBerry Messaging Agent synchronizes configuration data between the BlackBerry Configuration Database and user mailboxes.

The BlackBerry Messaging Agent integrates with existing email accounts in your organization. The BlackBerry Messaging Agent redirects messages from users' email applications to their BlackBerry devices automatically. If users configure identical signatures on their BlackBerry devices and in their email accounts, recipients cannot distinguish between the messages sent from BlackBerry devices and those sent from email applications.

When users move or delete messages or mark messages as read or unread on their BlackBerry devices or in their email applications, the BlackBerry Messaging Agent reconciles these changes over the wireless network between their BlackBerry devices and the email applications. By default, both BlackBerry devices and the BlackBerry® Enterprise Server reconcile email messages over the wireless network.

Wireless messaging features

BlackBerry® device users can use many of the same messaging features that are available in the email applications on their computers.

Feature	Description
email reconciliation	The BlackBerry® Enterprise Server reconciles the status of messages between users' BlackBerry devices and their email applications. If users delete, archive, or move messages to personal folders in their email applications, the messages are deleted from the message list on the users' BlackBerry devices. If users mark messages as read or unread in their email applications, the messages appear with the same status on their BlackBerry devices.

Feature	Description
	Administrators can turn off wireless email reconciliation.
email message filters	Users and BlackBerry Enterprise Server administrators can create and change email message filters. Email message filters determine the actions that the BlackBerry Enterprise Server takes if incoming messages match specific criteria: forward, forward with priority, or do not forward to BlackBerry devices. For example, users can create email message filters to forward messages from specific senders to their BlackBerry devices with high priority.
message forwarding	Users can turn off message forwarding to their BlackBerry devices, for example, if they are outside of a wireless coverage area. Administrators can also turn off message forwarding to users' BlackBerry devices.
signature	Users can add a signature to all of the messages that they send from their BlackBerry devices. Administrators can add a signature and disclaimers to all of the messages that the members of a user group send or a specific user sends.
out-of-office reply	Users can set and change their out-of-office replies using their BlackBerry devices.
contact lookup	Users can search for a contact’s first name, last name, or both in their organization's directory. The BlackBerry Enterprise Server returns results for up to 20 of the closest matches.
contact list updates	When users select contacts from the contact lookup results, they can add the contacts to the contact lists on their BlackBerry devices.
custom fields in the contact list	If your organization maintains custom fields in users’ personal contact lists, you can map these fields to corresponding fields that appear in the contact list on BlackBerry devices. Users can use these custom fields to search for contacts on their BlackBerry devices.
attachments	Users can send messages that contain attachments from their BlackBerry devices. The BlackBerry Attachment Service does not convert these messages; they are processed by the BlackBerry Messaging Agent only. Attachments must meet the following requirements: • If a user sends one attachment in a message, the file size of the attachment cannot exceed 3 MB. • If a user sends multiple attachments in a message, the total file size of the attachments cannot exceed 5 MB.

Feature	Description
	• If an attachment exceeds 64 KB, the BlackBerry device sends the attachment in multiple data packets. Users can send messages with attachments only from supported BlackBerry devices that run BlackBerry® Device Software version 4.2 or later. If you want to manage the system resources that the BlackBerry Messaging Agent uses to upload and send attachments, you can limit the size of attachments or prevent users from attaching files to messages. For example, if too many users are sending large attachments, such as pictures or video, you might want to limit the size of supported attachments or turn off support for message attachments.
downloading attachments	Users with BlackBerry Device Software version 4.5 or later can download attachments in any native format to their BlackBerry devices. Users can open and make changes to native file formats using an appropriate third-party application on their BlackBerry devices. Depending on the file format, users might be able to open files using the media application on their BlackBerry devices. To manage network resources in your organization's environment, you can change the maximum file size of attachments that users can download to their BlackBerry devices.
save sent messages	Users can configure their BlackBerry devices to save copies of messages that they send from their BlackBerry devices in the sent items folder in their email applications.

BlackBerry Collaboration Service

The BlackBerry® Collaboration Service provides a connection between an organization's instant messaging server and the collaboration client on BlackBerry devices. The BlackBerry Collaboration Service integrates with existing instant messaging applications. The BlackBerry® Enterprise Server supports the following collaboration clients:

- BlackBerry® Client for use with Microsoft® Office Live Communications Server 2005
- BlackBerry® Client for use with Microsoft® Office Communications Server 2007
- BlackBerry® Client for IBM® Lotus® Sametime®
- BlackBerry® Client for Novell® GroupWise® Messenger

The BlackBerry Collaboration Service sends messages between the organization's instant messaging server, the BlackBerry Enterprise Server, and BlackBerry devices using public APIs, protocols that are defined by IBM, Microsoft, and Novell, and a Research In Motion proprietary protocol.

Instant messaging features

Using the collaboration clients on their BlackBerry® devices, users can use many of the same features that are available in the instant messaging applications on their computers.

Feature	Description
session management	You can specify the number of simultaneous instant messaging sessions that the BlackBerry Collaboration Service supports. You can also specify a timeout threshold, after which the BlackBerry Collaboration Service ends inactive sessions automatically and permits new sessions to start. You can control whether users of certain versions of the BlackBerry® Client for IBM® Lotus® Sametime® or the BlackBerry® Client for Novell® GroupWise® Messenger can see an icon on their BlackBerry devices when contacts in their contact lists are using the same collaboration clients. By default, the icon appears.
conversations with multiple contacts	Users can start and manage conversations with multiple instant messaging contacts on their BlackBerry devices.
availability status	Users can change their availability status while they are logged in to their collaboration clients. For example, users can set their availability status to away or busy.
presence updates	Using the latest version of the collaboration clients, users can set their availability status to display as away if they do not use their BlackBerry devices for a specified period of time.
presence level	Using the latest version of the BlackBerry® Client for use with Microsoft® Office Communications Server 2007, users can set the presence level of contacts in their contact lists. Each presence level consists of rules that determine how a contact can interact with a user through the instant messaging application. For example, users can assign the Personal presence level to their contacts.
contact pictures	Using the latest version of the collaboration clients, users can add pictures to the contacts in their contact lists. The pictures that users add using the collaboration clients on their BlackBerry devices are not synchronized with the instant messaging applications on users' computers.

Feature	Description
synchronized contact lists	The instant messaging contact lists on users' BlackBerry devices are synchronized with the contact lists in their organization's instant messaging application.
contact alerts	Users can request alerts when specific contacts become available.
file transfer	Using the latest version of the BlackBerry Client for IBM Lotus Sametime, users can send files to contacts in their contact lists. Recipients can view supported file formats on their BlackBerry devices.
link instant messaging contacts to the BlackBerry contact list	Using the latest version of the collaboration clients, users can link instant messaging contacts to existing contact list entries on their BlackBerry devices, or they can create new contact list entries for instant messaging contacts and populate them with information from their organization's messaging server.
send email messages from contact list	Using the latest version of the collaboration clients on their BlackBerry devices, users can send email messages to contacts directly from their contact lists.
call contacts	Using the latest version of the collaboration clients on their BlackBerry devices, users can call instant messaging contacts directly from their contact lists. After a user starts an instant messaging conversation with a contact, the user can make a call to that contact from the conversation window. Phone numbers for contacts are retrieved from the messaging server or from the BlackBerry contact list if the user is linked to an existing contact list entry.
email conversation history	Using the latest version of the collaboration clients, users who are participating in an instant messaging conversation can send the history of the conversation as an email message to the participants of the conversation and to additional contacts from their BlackBerry contact lists.
embedded links	Users can click phone numbers in instant messages to make calls and they can click links in instant messages to view web pages.
public groups	Using the latest version of the BlackBerry Client for IBM Lotus Sametime, users can add public groups to their instant messaging contact lists.
location information	Using the latest version of the BlackBerry Client for IBM Lotus Sametime or the BlackBerry Client for use with Microsoft Office Communications Server 2007, users can set their current location to display in their contact information. For example, users can set their current location to "In the office." This feature is not available if your organization's environment uses IBM Lotus Sametime version 6.5.1.

Feature	Description
announcements	Using the latest version of the BlackBerry Client for IBM Lotus Sametime or the BlackBerry Client for Novell GroupWise Messenger, users can send announcements to groups or multiple contacts in their contact lists.
send messages to users who have not been added to a contact list	Using the latest version of the BlackBerry Client for IBM Lotus Sametime, the BlackBerry® Client for use with Microsoft® Office Live Communications Server 2005, or the BlackBerry Client for use with Microsoft Office Communications Server 2007, users can send instant messages to contacts they have not added to their contact lists.
dormant mode	The collaboration clients enter dormant mode automatically after five minutes of inactivity. In dormant mode, the applications do not receive presence updates for contacts. Dormant mode is designed to reduce wireless network traffic in an organization's messaging environment. The collaboration clients turn off dormant mode when users open or use the applications, or receive conference requests, alerts, or messages from contacts.

BlackBerry Synchronization Service

The BlackBerry® Synchronization Service synchronizes organizer data such as tasks, memos, and contacts over the wireless network so that the entries on BlackBerry devices are consistent with the entries in the email applications. With wireless data synchronization and wireless email reconciliation, users do not have to connect their BlackBerry devices to the BlackBerry® Desktop Software to synchronize organizer data and reconcile messages.

The BlackBerry Synchronization Service automatically backs up user settings and data over the wireless network from BlackBerry devices to the BlackBerry Configuration Database. You can restore these settings and data to BlackBerry devices when they activate over the wireless network. By default, the BlackBerry® Enterprise Server automatically backs up the settings and data over the wireless network.

Synchronization features

You can change the settings for synchronization features to manage the user experience and the use of system resources in your organization's environment.

Feature	Description
initial synchronization	When the BlackBerry® Enterprise Server sends service books to BlackBerry devices to turn on wireless data synchronization, an initial data synchronization process starts. This process synchronizes the data for calendar items and messages between users' BlackBerry devices and the email applications on their computers. It also resolves conflicting or duplicate entries to prevent data loss.
synchronization settings	You can configure settings for wireless data synchronization that apply to specific users, to user groups, or to all users on all BlackBerry Enterprise Server instances. You can define which organizer data items the BlackBerry Synchronization Service synchronizes, how data conflicts are resolved, and whether changes are synchronized in both directions or in one direction only between BlackBerry devices and email applications. You can use IT policies to configure the settings for wireless data synchronization.
support for different types of user access	The BlackBerry Enterprise Server requires access to the organizer application databases for all users. You can define the location of the database replicas in each user's profile, set up roaming user profiles, or use web access templates in your organization's messaging environment.
synchronization of contact pictures	The BlackBerry Synchronization Service synchronizes contact pictures between users' BlackBerry devices and the email applications on their computers. If users add, change, or delete contact pictures on their BlackBerry devices, the address books in their email applications reflect the changes. The BlackBerry Synchronization Service cannot synchronize contact pictures that are larger than 32 KB.

BlackBerry Attachment Service

The BlackBerry® Attachment Service converts supported message attachments into a format that users can view on their BlackBerry devices. The BlackBerry Attachment Service processes attachments and converts them into a binary format that retains most of the layout, appearance, and navigation of the original attachments. You do not have to install the applications that are associated with the attachment formats on BlackBerry devices. The attachment viewer installs automatically with the BlackBerry® Device Software.

The BlackBerry Attachment Service receives attachments that are embedded in messages from the messaging server, through the BlackBerry Messaging Agent. The BlackBerry Attachment Service also receives attachments that are accessed through links in the BlackBerry® Browser.

The BlackBerry Attachment Service enables users to play supported audio attachments on supported BlackBerry devices that are running BlackBerry Device Software version 4.2 or later. The BlackBerry Attachment Service can convert .wav files into an audio format that a BlackBerry device series supports (for example, .mp3 files on BlackBerry® 8700 Series devices).

Attachment file formats supported by the BlackBerry Attachment Service

Format	Extension
Adobe® Acrobat® versions 1.1, 1.2, 1.3, and 1.4	.pdf
ASCII text	.txt
audio	.amr, .mp3, .wav
Corel® WordPerfect® versions 6.0, 7.0, 8.0, 9.0 (2000), and 10.0	.wpd
HTML	.htm, .html
images	.bmp, .gif, .jpeg, .jpg, .png, .tif, .tiff, .wmf
Microsoft® Excel® versions 97, 2000, 2003, and XP	.xls
Microsoft® PowerPoint® versions 97, 2000, 2003, and XP	.pps, .ppt
Microsoft® Word versions 97, 2000, 2003, and XP	.doc, .dot
RTF	.rtf
ZIP archives	.zip

BlackBerry MDS

The BlackBerry® Mobile Data System is a flexible framework for application development that you can use for adding and managing applications in your environment. As a component of the BlackBerry® Enterprise Server, the BlackBerry MDS offers security, wireless connectivity, and manageability options, while also supporting several preferred development methods for creating and delivering wireless applications to BlackBerry devices. To simplify the integration of wireless applications with existing applications and systems, the BlackBerry MDS uses standards-based methods and protocols.

Component	Description
BlackBerry MDS Services	You can use the BlackBerry MDS Services to send, maintain, and manage wireless applications on BlackBerry devices. The BlackBerry MDS Services are designed to provide wireless connectivity between applications on BlackBerry devices and your organization's existing applications. The BlackBerry MDS Services include the following components:

Component	Description
	• **BlackBerry MDS Integration Service**: The BlackBerry MDS Integration Service enables BlackBerry® MDS Runtime Applications to interact with back-end systems using web services or direct database connections. You can install the BlackBerry MDS Integration Service when you install the BlackBerry Enterprise Server. • **BlackBerry MDS Connection Service**: The BlackBerry MDS Connection Service processes requests for web content from the BlackBerry® Browser or from BlackBerry Java® Applications. The BlackBerry MDS Connection Service also manages TCP/IP and HTTP-based connections between BlackBerry Applications and the applications residing on your organization's application servers, web servers, or databases that are located behind your organization's firewall.
BlackBerry MDS development tools	Developers in your organization can use development tools to create the following types of wireless applications for BlackBerry devices: BlackBerry Browser Applications, BlackBerry Java Applications, and BlackBerry MDS Runtime Applications. For more information about BlackBerry development tools, visit www.blackberry.com/developers.
BlackBerry MDS device software	BlackBerry devices use BlackBerry MDS device software to run BlackBerry Applications: • BlackBerry® MDS Runtime: used to run BlackBerry MDS Runtime Applications • BlackBerry APIs and Java ME: used to run BlackBerry Java Applications; standard on BlackBerry devices • BlackBerry Browser: used to run BlackBerry Browser Applications; standard on BlackBerry devices To download the BlackBerry MDS Runtime, visit www.blackberry.com.

For more information about the BlackBerry MDS and the types of BlackBerry Applications, visit www.blackberry.com/developers to see the *BlackBerry Mobile Data System Technical Overview*.

BlackBerry Applications

BlackBerry® devices support BlackBerry® Browser Applications, BlackBerry Java® Applications, and BlackBerry® MDS Runtime Applications.

BlackBerry Browser Applications are simplified, web-based applications that users access using the BlackBerry Browser. For example, a developer can create a BlackBerry Browser Application that your organization can use to collect data input from BlackBerry device users.

BlackBerry Java Applications can range from simple applications, such as a game on BlackBerry devices, to complex applications with an advanced user interface and various options for data management, storage, and network communication. BlackBerry Java Applications can use a client-only architecture, meaning that they do not send data to or receive data from a content server, or they can use a client/server application model, sending data to and receiving data from a content server. For example, a developer can create a BlackBerry Java Application so that users can send data to and receive data from a central sales database.

BlackBerry MDS Runtime Applications are lightweight, rich-client applications that are created using BlackBerry® MDS Studio or the BlackBerry® Plug-in for Microsoft® Visual Studio®. BlackBerry MDS Runtime Applications communicate with an organization's systems through the BlackBerry MDS Integration Service, a component of the BlackBerry® Enterprise Server. BlackBerry MDS Runtime Applications can range from simple to complex, but they are typically forms-based applications that you can use to access web services or databases that are located inside your organization's firewall. Web services or a database contain the data and operations that developers can use to create BlackBerry MDS Runtime Applications, and they also process the data that they receive from BlackBerry MDS Runtime Applications. For example, a developer can create a BlackBerry MDS Runtime Application so that users can look up data from a directory in your organization.

Using BlackBerry MDS Studio version 2.0 or later or the BlackBerry Plug-in for Microsoft Visual Studio version 1.1 or later, application developers in your organization can design BlackBerry MDS Runtime Applications that standard BlackBerry Applications (for example, the address book) and custom BlackBerry Java Applications can invoke.

For more information about customizing BlackBerry MDS Runtime Applications, visit www.blackberry.com/developers to see the *BlackBerry MDS Studio Developer Guide* and the *BlackBerry Plug-in for Microsoft Visual Studio Developer Guide*.

Types of BlackBerry Applications

Type	BlackBerry® Mobile Data System components used
BlackBerry® Browser Applications	Developers create the applications using: • standard web development tools The BlackBerry® Enterprise Server communicates with the applications using: • BlackBerry MDS Connection Service

Type	BlackBerry® Mobile Data System components used
	BlackBerry devices run the applications using: • BlackBerry Browser
BlackBerry Java® Applications	Developers create the applications using: • BlackBerry® Java® Development Environment • standard Java application development tools The BlackBerry Enterprise Server communicates with the applications using: • BlackBerry MDS Connection Service BlackBerry devices run the applications using: • BlackBerry APIs and Java ME
BlackBerry MDS Runtime Applications	Developers create the applications using: • BlackBerry® MDS Studio • BlackBerry® Plug-in for Microsoft® Visual Studio® The BlackBerry Enterprise Server communicates with the applications using: • BlackBerry MDS Integration Service • BlackBerry MDS Connection Service BlackBerry devices run the applications using: • BlackBerry® MDS Runtime

For more information about the options for developing BlackBerry Applications, visit www.blackberry.com/developers to see the *BlackBerry Mobile Data System Technical Overview*.

BlackBerry MDS Connection Service

The BlackBerry® MDS Connection Service connects wireless applications on BlackBerry devices to the applications on an organization's application servers or web servers. After a wireless application is installed on a BlackBerry device, it can receive data from push applications that are located on application servers or web servers. The application can also receive data by sending a pull request from a BlackBerry device to applications that are located on application servers or web servers. The BlackBerry MDS Connection Service processes push and pull requests and delivers data and updates to BlackBerry Applications.

The BlackBerry MDS Connection Service also receives and responds to web requests from the BlackBerry® Browser and other BlackBerry Applications, so that users can view Internet and intranet content on their BlackBerry devices. The BlackBerry MDS Connection Service sends login requests and requests for instant messaging sessions from BlackBerry devices to the BlackBerry Collaboration Service. If you stop the BlackBerry MDS Connection Service, you also stop the BlackBerry Collaboration Service.

Feature	Description
protocol connections	You can define connections to the web servers on your organization's intranet or the Internet using standard Internet protocols such as HTTP, HTTPS, and TCP/IP.
encrypted communications	The BlackBerry MDS Connection Service encrypts content using the same standard BlackBerry encryption that the BlackBerry Dispatcher uses to encrypt messages and other data.
data conversion	The BlackBerry MDS Connection Service converts data from application servers and web servers into a format that BlackBerry Applications can interpret and display.
data optimization	The BlackBerry MDS Connection Service processes content for viewing in the BlackBerry Browser. For example, the BlackBerry MDS Connection Service can change the data format or remove extraneous data to reduce network traffic.
authentication methods	You can configure authentication requirements that match your organization's sign-on scheme using standard methods such as NTLM, Kerberos™, and LTPA. You can also define a period of time after which the BlackBerry MDS Connection Service requests user credentials and caches cookies. You can use two-factor authentication to create VPN connections between wireless applications on BlackBerry devices and your organization's application servers and web servers.
integration with proxy servers	You can provide access to specific content through your organization's proxy servers using the following items: • proxy exclusion list, which defines the organization-specific URLs that the BlackBerry MDS Connection Service uses to connect directly to external web services instead of routing the connections through the organization's proxy server • proxy auto-configuration (.pac) file

Feature	Description
access control	You can configure push initiators and push rules that define which server-side push applications can send application data and updates to BlackBerry devices, and which users can receive push requests. You can configure pull rules to specify which web servers users can access using the BlackBerry Browser and other applications on BlackBerry devices.
media content management	You can control which media files users can receive and access using the BlackBerry Browser and BlackBerry Applications. You can prevent users from receiving certain media types (for example, video files), or you can prevent users from receiving specific subtypes of media (for example, .mp3 files). You can also configure size limits for media files that users can receive on their BlackBerry devices.

BlackBerry MDS Integration Service

The BlackBerry® MDS Integration Service allows you to install, update, and manage BlackBerry® MDS Runtime Applications on BlackBerry devices. The BlackBerry MDS Integration Service supports standard methods of integrating wireless applications and enterprise applications, for example, by allowing BlackBerry MDS Runtime Applications to access and use web services on an application server.

Your organization's developers can create BlackBerry MDS Runtime Applications using the BlackBerry® MDS Studio or the BlackBerry® Plug-in for Microsoft® Visual Studio®, and publish those applications to the BlackBerry MDS Application Repository. Using the BlackBerry Manager, you can install, upgrade, and remove BlackBerry MDS Runtime Applications on BlackBerry devices over the wireless network, and you can manage and quarantine different versions of BlackBerry MDS Runtime Applications.

Feature	Description
installation options	By default, users can search for and install the BlackBerry MDS Runtime Applications that are stored in the BlackBerry MDS Application Repository, using the BlackBerry MDS Control Center on their BlackBerry devices. You can prevent users from searching for the applications. You can also make the installation, upgrade, or removal of specific BlackBerry MDS Runtime Applications from BlackBerry devices mandatory.
encrypted communication	The BlackBerry MDS Integration Service encrypts all of the data that it sends to and receives from BlackBerry devices.

Feature	Description
troubleshooting tools	The BlackBerry Manager displays a series of error messages when unexpected behavior occurs, such as when an application cannot connect to a content server. You can respond to possible issues by quarantining a BlackBerry MDS Runtime Application on a single user's BlackBerry device or in the BlackBerry MDS Application Repository.
message monitoring	BlackBerry MDS Runtime Applications can request data from an application server or web server using a series of messages. Web servers return the requested data using the same message format. You can monitor the messages that BlackBerry MDS Runtime Applications send to or recieve from the application servers or web servers that host application content.
PKI-compliant application certificates	The BlackBerry MDS Studio creates certificates and uses them to sign applications that comply with the PKI X.509 standard. You can use these certificates to encrypt the connections that the BlackBerry MDS Integration Service establishes to sensitive content.
control over user access and permissions	You can configure and assign BlackBerry MDS Integration Service device policies to users and user groups to control how users discover and access BlackBerry MDS Runtime Applications, and to define whether BlackBerry MDS Runtime Applications can access data from other applications on BlackBerry devices.
performance management	You can specify message queue limits for data that BlackBerry MDS Runtime Applications send and receive.

BlackBerry device management

You can use the BlackBerry® Enterprise Server to control how you implement, maintain, and upgrade BlackBerry devices across your organization.

Wireless implementation of BlackBerry devices

Administrators can activate users' BlackBerry® devices over the wireless network, instead of activating the BlackBerry devices through a direct connection with the BlackBerry Manager computer, or instructing users to activate their BlackBerry devices using the BlackBerry® Desktop Manager on their computers. During the wireless activation process, 200 of the user's most recent email messages are sent to the BlackBerry device, and on initial synchronization, populates the BlackBerry device with the user's organizer data.

You can use the wireless activation process, with message prepopulation and automatic wireless backup, to provide a user who is away from the office with a replacement BlackBerry device that contains the same user settings and data as the user's previous BlackBerry device. You can also use the wireless activation process to redistribute a BlackBerry device to a new user.

Centralized maintenance of BlackBerry devices

You can use the BlackBerry® Manager to manage all BlackBerry devices in a BlackBerry Domain from a single location.

Feature	Description
central software location	You can store and install BlackBerry® Device Software and add the BlackBerry Applications from a central location. From this location, you can update the software version and deliver the software over the wireless network to all BlackBerry devices in a BlackBerry Domain.
BlackBerry device configurations	You can use software configurations to compare the BlackBerry Device Software and wireless applications on a BlackBerry device with the BlackBerry Device Software and wireless applications defined in the user's software configuration. The BlackBerry Manager reports this information so that you can identify BlackBerry devices that are not running the most recent or preferred version of the BlackBerry Device Software or wireless applications.
BlackBerry device reporting	The BlackBerry device agent sends information to the BlackBerry Manager over the wireless network. This enables you to keep a current statistical inventory of the BlackBerry devices that are implemented in your organization.
wireless application delivery	You can use software configurations to send BlackBerry Java® Applications to BlackBerry devices over the wireless network.

Controlling third-party applications on BlackBerry devices

Feature	Description
control the installation and removal of third-party applications	Allow users to download and install third-party applications on BlackBerry® devices or prevent them from downloading applications. You can also remove applications from BlackBerry devices over the wireless network.

Feature	Description
control the resources that third-party applications can access	Create application control policies or BlackBerry MDS Integration Service device policies that specify the resources that third-party applications can access on BlackBerry devices (for example, message, phone, and key store). Create IT policies that specify the type of connections that third-party applications on BlackBerry devices can establish (for example, opening network connections inside the firewall).
control the availability of BlackBerry® MDS Runtime Applications	Create BlackBerry MDS Integration Service device policies to control whether users can search for BlackBerry MDS Runtime Applications in the BlackBerry MDS Application Repository.

BlackBerry Enterprise Solution security

The BlackBerry® Enterprise Solution is designed to encrypt data in transit at all points between the BlackBerry device and the BlackBerry® Enterprise Server to protect your organization from data loss or alteration. Only the BlackBerry Enterprise Server and the BlackBerry device can access the data that they send between them. If events that threaten the wireless security of your organization occur, third parties, including wireless service providers, cannot access your organization's potentially sensitive information in a decrypted format.

The BlackBerry Enterprise Solution uses symmetric key cryptography to encrypt messages and user data that it sends over the transport layer to provide the following criteria for the security of wired and wireless solutions.

Criteria	Description
confidentiality	The BlackBerry Enterprise Solution uses encryption to make sure that only the intended message recipients can view the contents of the message.
integrity	The BlackBerry Enterprise Solution protects each message that the BlackBerry device sends with one or more message keys. To prevent third-party decryption or alteration of the message data, the message keys are designed to consist of random data. Only the BlackBerry Enterprise Server and the BlackBerry device know the value of the master encryption key, recognize the format of the decrypted and decompressed message, and automatically reject a message that is not encrypted with the correct master encryption key.
authenticity	The BlackBerry device authenticates itself to the BlackBerry Enterprise Server to prove that it knows the master encryption key before the BlackBerry Enterprise Server can send data to the BlackBerry device.

Master encryption keys

The BlackBerry® Enterprise Server and the BlackBerry device each store a copy of the unique master encryption key of the BlackBerry device.

Only the BlackBerry Enterprise Server and the BlackBerry device know the value of the master encryption key. When you activate a BlackBerry device over the wireless network, the BlackBerry Enterprise Server and the BlackBerry device use an authenticated link to communicate the value of the master encryption key.

For a user to send and receive messages on the BlackBerry device, the BlackBerry Enterprise Server and the BlackBerry device must store matching copies of the master encryption key of the BlackBerry device. If the stored keys do not match, the following actions occur:

- the BlackBerry Enterprise Server and the BlackBerry device must delete messages that they receive from each other because they cannot decrypt them
- the BlackBerry device requires the user to generate a new master encryption key

Standard message encryption

The BlackBerry® Enterprise Solution uses a symmetric key encryption algorithm to protect data in transit between the BlackBerry device and BlackBerry® Enterprise Server. This standard BlackBerry encryption, which is designed to provide strong security, protects data in transit to the BlackBerry Enterprise Server when the message data is outside the organization's firewall.

Standard BlackBerry encryption is designed to encrypt messages that the BlackBerry device sends or that the BlackBerry Enterprise Server forwards to the BlackBerry device

- from the time the user sends an email message or PIN message from the BlackBerry device to when the BlackBerry Enterprise Server receives the message
- from the time the BlackBerry Enterprise Server receives a message to when the user opens the decrypted message on the BlackBerry device.

Before the BlackBerry device sends a message it compresses the message and then encrypts the message using the master encryption key, which is unique to that BlackBerry device. The BlackBerry device does not use the master encryption key in the compression process.

When the BlackBerry Enterprise Server receives the message from the BlackBerry device, the BlackBerry Dispatcher decrypts the message using the master encryption key for the BlackBerry device, and then decompresses the message.

How the BlackBerry Enterprise Solution uses a Triple DES encryption algorithm

The BlackBerry® Enterprise Solution uses a two-key Triple DES encryption algorithm to create message keys and master encryption keys. In each of three iterations of the DES algorithm, the first of two 56-bit keys in outer CBC mode encrypts the data, the second key decrypts the data, and then the first key encrypts the data again. For more information, see *Federal Information Processing Standard - FIPS PUB 81 [3]*.

The BlackBerry Enterprise Solution stores the message keys and master encryption keys, which have overall key lengths of 112 bits and include 16 bits of parity data, as 128-bit long binary strings, with each parity bit in the least significant bit of each of the 8 bytes of key data.

How the BlackBerry Enterprise Solution uses an AES encryption algorithm

The BlackBerry® Enterprise Solution uses an AES algorithm in CBC mode to create message keys and master encryption keys that contain 256 bits of key data.

The way that the BlackBerry device implements AES is designed to protect user data and encryption keys on the BlackBerry device from traditional attacks and side-channel attacks. Side-channel attacks can occur in the form of power analysis readings or electromagnetic radiation emissions.

The BlackBerry device implements AES in a way that uses countermeasures (a masking operation, table splitting, and applications of random masks) to hide the true operations taking place on the BlackBerry device. These countermeasures are designed to help protect the cryptographic keys and plain-text data against potential side-channel attacks at all points during the AES encryption and decryption operations so that the attacks do not reveal data that can expose the encryption key.

Options for extending messaging security

When a user sends a message from the BlackBerry® device, by default, the BlackBerry® Enterprise Server does not encrypt the message when it forwards the message to the message recipient. To extend the messaging security that standard BlackBerry encryption provides, the user must install additional secure messaging technology on the BlackBerry device, and you must set the BlackBerry device to use that secure messaging technology.

To offer an additional layer of messaging security between the sender and recipient of an email message or PIN message, you can turn on S/MIME technology or PGP® technology for BlackBerry devices. When you use either one of these technologies, you allow sender-to-recipient authentication and confidentiality. These technologies also help to maintain the integrity and privacy of the data from the time that a BlackBerry device user sends a message from the BlackBerry device to when the message recipient decrypts and opens the message.

Options for encrypting stored data

You can configure the BlackBerry® Enterprise Solution to encrypt the user data and the encryption keys on a locked BlackBerry device.

Protection of user data on locked BlackBerry devices

When the content protection feature on the BlackBerry® device is turned on, the BlackBerry device is designed to protect user data in the following ways:

- use 256-bit AES encryption to encrypt stored data
- use an ECC public key to encrypt data that the BlackBerry device receives

User data that the BlackBerry device can encrypt when the content protection feature is turned on

Item	Description
AutoText	all text that automatically replaces the text that a BlackBerry® device user types
BlackBerry® Browser	• content that web sites or third-party applications push to the BlackBerry device • web sites that the user saves on the BlackBerry device • browser cache
calendar	• subject • location • meeting organizer • meeting participants • notes included in the appointment or meeting invitation
address book contacts	all contact information except the contact title and category For information about using the Force Include Address Book In Content Protection IT policy rule to prevent users from turning off encryption for the address book, see the *Policy Reference Guide*.
message list	• subject • email addresses • message body • attachments

Item	Description
memo list	• title • information included in the body of the note
Open Mobile Alliance™ DRM applications	a key that identifies the BlackBerry device and a key that identifies the SIM card (if available) that the BlackBerry device adds to DRM forward-locked applications
RSA SecurID® library	the contents of the .sdtid file seed that is stored in flash memory
tasks	• subject • information included in the body of the task

Protection of master encryption keys on locked BlackBerry devices

If you turn on the content protection of master encryption keys feature, the BlackBerry® device uses the grand master key to encrypt the master encryption keys that are stored in flash memory and stores the decrypted grand master key in RAM.

When you, the user, or the password timeout locks the BlackBerry device, the BlackBerry device continues to receive data and does not free the memory associated with the grand master key. When the BlackBerry device receives data that is encrypted with a master encryption key while it is locked, it uses the decrypted grand master key to decrypt the required master encryption key that is stored in flash memory and receive the data.

Controlling BlackBerry device access to the BlackBerry Enterprise Server

You can turn on the Enterprise Service Policy to control which BlackBerry® devices can connect to the BlackBerry® Enterprise Server. After you turn on the Enterprise Service Policy, by default, the BlackBerry Enterprise Server prevents connections from new BlackBerry devices that you associate with it; however, it allows connections from BlackBerry devices that are already activated on the BlackBerry Enterprise Server. The Enterprise Service Policy also applies to devices with BlackBerry® Connect™ software, devices with BlackBerry® Built-In™ software, and devices that are running the BlackBerry® Application Suite.

You can use the Enterprise Service Policy to create allowed lists that control which BlackBerry devices users can activate on a BlackBerry Enterprise Server, over the wireless network, or over a serial connection. BlackBerry devices that meet the allowed list criteria can complete the activation process on that BlackBerry Enterprise Server.

You can define the following types of criteria:

- specific, allowed BlackBerry device PINs as a string
- allowed range of BlackBerry device PINs

You can also control access to the BlackBerry Enterprise Server based on specific manufacturers and models of BlackBerry devices. The BlackBerry Manager includes lists of allowed manufacturers and models based on the properties of the BlackBerry devices that are associated with the BlackBerry Enterprise Server. You can clear items in these lists to prevent further connections by BlackBerry devices of a specific manufacturer or model.

You can allow a specific user to override the Enterprise Service Policy so that the user can still connect to the BlackBerry Enterprise Server even if that user's BlackBerry device or BlackBerry enabled device meets criteria that you exclude from the allowed list.

Management of BlackBerry device security over the wireless network using IT administration commands

Goal	Description
erase application data on a lost or stolen BlackBerry® device	If a BlackBerry device is lost or stolen, you can send the Erase data and disable BlackBerry device IT administration command to delete all information and application data from the BlackBerry device and make the BlackBerry device unavailable.
lock a misplaced BlackBerry device	If a BlackBerry device is misplaced but likely not stolen or lost, you can send the Set password and lock the BlackBerry device IT administration command to set a password and lock the BlackBerry device. You can also send this IT administration command if a user forgets the BlackBerry device password.
label a BlackBerry device with owner information	If a BlackBerry device is stolen or lost, you can send the Set owner information IT administration command to make owner information appear on the screen when the BlackBerry device is locked. The owner information might include contact information that the finder can use to return the BlackBerry device to the owner.

BlackBerry Policy Service

The BlackBerry® Policy Service performs administration services over the wireless network. It sends IT policies and IT administration commands and provisions service books.

The BlackBerry® Enterprise Server uses the BlackBerry Policy Service to send IT policies to BlackBerry devices. An IT policy is made up of rules that define BlackBerry device security, settings for synchronizing data over the wireless network, and other behaviors for the individual user accounts or groups of user accounts that you define. You can use the BlackBerry Manager to configure IT policies.

Feature	Description
wireless delivery	When you configure IT policies, all settings take effect when the BlackBerry Policy Service delivers them to BlackBerry devices over the wireless network. New IT policy rule settings write to the user configurations on BlackBerry devices automatically. To keep the IT policy rule settings current, the BlackBerry Enterprise Server periodically sends the IT policies to BlackBerry devices over the wireless network.
IT policy coverage	When you install the BlackBerry Enterprise Server and add user accounts to it, the BlackBerry Policy Service adds the user accounts to the default IT policy automatically. Until BlackBerry devices accept the IT policy, the user accounts are not active on the BlackBerry Enterprise Server. You can assign a different IT policy to user accounts. User accounts must always be assigned to one IT policy. If you delete all IT policies, the BlackBerry Policy Service assigns user accounts to the default IT policy automatically.
IT policy assignment	You can assign an IT policy to individual user accounts or groups of user accounts.
resend options	If the BlackBerry Enterprise Server cannot send an updated IT policy to a BlackBerry device immediately—for example, if a user is outside of a wireless coverage area—you can resend the IT policy manually or configure the period of time after which the BlackBerry Policy Service resends the IT policy automatically. The BlackBerry Enterprise Server continues to resend the IT policy automatically until it sends the IT policy to a BlackBerry device successfully.
security enforcement	You can configure IT policies to override user-defined security settings on BlackBerry devices.

Feature	Description
	You can configure IT polices that define security settings for BlackBerry devices and the BlackBerry® Desktop Software. For example, you can configure whether a BlackBerry device password is required, the length of time that a password can exist before it is not valid, and the length and composition of a password. You can also use IT policies to specify encryption key details.

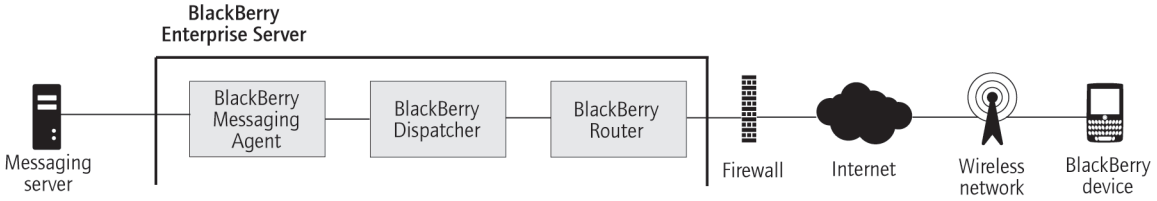
BlackBerry Configuration Panel

The BlackBerry® Configuration Panel displays data, such as BlackBerry Configuration Database settings, that the BlackBerry® Enterprise Server setup application gathered during the installation process. You can use the BlackBerry Configuration Panel to change configuration data after you install the BlackBerry Enterprise Server.

BlackBerry Enterprise Server process flows 4

Messaging process flows

Process flow: Sending a message to a BlackBerry device



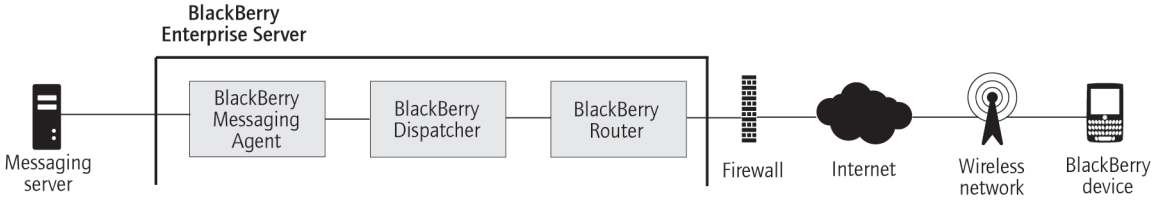
1. A new message arrives in a user's mailbox and Microsoft® Exchange notifies the BlackBerry® Messaging Agent.
2. The BlackBerry Messaging Agent applies global filter rules to the messages in the user's mailbox and filters the messages that match the filter criteria.

   If no global filter rules apply, the BlackBerry Messaging Agent applies user-defined filter rules to the messages in the user's mailbox.
3. The BlackBerry Messaging Agent sends the first 2 KB of the message to the BlackBerry Dispatcher.
4. The BlackBerry Dispatcher compresses the first 2 KB of the message, encrypts it with the master encryption key of the BlackBerry device, and sends the encrypted data to the BlackBerry Router.
5. The BlackBerry Router sends the encrypted data to the wireless network over port 3101.
6. The wireless network verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network, and sends the message data to the BlackBerry device.
7. The BlackBerry device sends a delivery confirmation to the BlackBerry Dispatcher. The BlackBerry Dispatcher sends the delivery confirmation to the BlackBerry Messaging Agent.

   If the BlackBerry Messaging Agent does not receive a delivery confirmation within four hours, it sends the message to the wireless network again.

   The delivery confirmation verifies that the wireless network delivered the message to the BlackBerry device, but it does not verify that the user received or opened the message.
8. The BlackBerry device decrypts and decompresses the message so that the user can view it, and notifies the user that the message has arrived.

Process flow: Sending a message from a BlackBerry device



This process flow applies to new messages, reconciled messages (messages that are moved, deleted, or marked as read or unread), and wireless calendar entries.

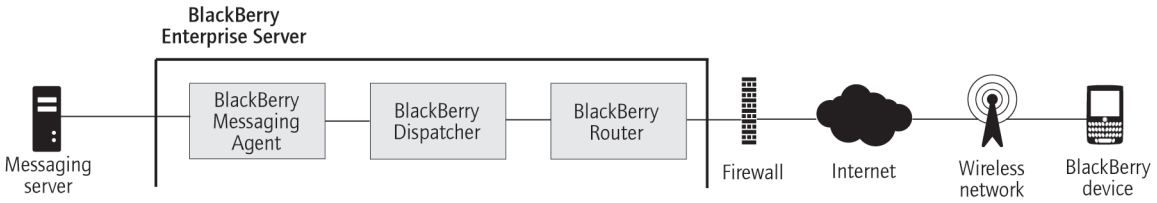
1. A user sends a message from a BlackBerry® device.

   The BlackBerry device assigns a RefId to the message. If the message is a meeting invitation or calendar entry, the BlackBerry device appends the calendar information to the message.
2. The BlackBerry device compresses and encrypts the message, and sends the message to the wireless network over port 3101.
3. The wireless network sends the message to the BlackBerry® Enterprise Server.

   The BlackBerry Enterprise Server accepts only encrypted messages from the BlackBerry device.
4. The BlackBerry Dispatcher uses the master encryption key of the BlackBerry device to decrypt and decompress the message.

   If the BlackBerry Dispatcher cannot decrypt the message using the master encryption key, the BlackBerry Enterprise Server ignores the message and sends an error message to the BlackBerry device.
5. The BlackBerry Messaging Agent sends the message to the user's email application.
6. The BlackBerry Messaging Agent sends a copy of the message to the Sent Items view in the user's email application.
7. The messaging server delivers the message to the recipients.

Process flow: Sending a message that contains an attachment from a BlackBerry device



1. A user attaches a file to a message on a BlackBerry® device and sends the message.
   - If the BlackBerry device is not running BlackBerry® Device Software Version 4.2 or later, and if the BlackBerry device does not have a CMIME service book that indicates that the BlackBerry® Enterprise Server supports attachment uploads, the Add Attachment menu item does not appear on the BlackBerry device.
   - If the user tries to attach a file that exceeds the maximum file size that an administrator specified, a notification appears and the user cannot attach the file.
2. The BlackBerry device compresses and encrypts the message, and sends the message to the wireless network over port 3101.

   The BlackBerry device formats the header of the message to indicate that a large attachment is part of the message, but it does not send the attachment content.
3. The wireless network sends the message to the BlackBerry Enterprise Server.
4. The BlackBerry Dispatcher decrypts and decompresses the message with the master encryption key of the BlackBerry device.

   If the BlackBerry Dispatcher cannot decrypt the message with the master encryption key, the BlackBerry Enterprise Server ignores the message and sends an error message to the BlackBerry device.
5. The BlackBerry Messaging Agent stores the message properties in the user's mailbox.

   The BlackBerry Messaging Agent sends a request through the BlackBerry Dispatcher to the BlackBerry device for the attachment content.
6. The BlackBerry device sends the attachment content through the BlackBerry Dispatcher to the BlackBerry Messaging Agent.

   If the attachment content is larger than a single data packet, the BlackBerry device divides the content into multiple data packets and sends the data packets to the BlackBerry Messaging Agent.
7. The BlackBerry Messaging Agent verifies the validity of the attachment content, and stores the content in memory as it arrives.

   During the delivery of the attachment content, if the BlackBerry Messaging Agent does not receive content from the BlackBerry device for 15 minutes, the BlackBerry Messaging Agent cancels the message, deletes the partial attachment content from temporary storage, and sends an error message to the BlackBerry device.
8. After all of the attachment content arrives, the BlackBerry Messaging Agent checks for other attachments that are part of the same message.
   - If another attachment exists, the BlackBerry Messaging Agent requests the attachment content.
   - If no additional attachments exist, the BlackBerry Messaging Agent finishes processing the message and sends the message to the user's email application.
9. The messaging server delivers the message to the intended recipients.

Process flow: Searching an organization's address book on a BlackBerry device

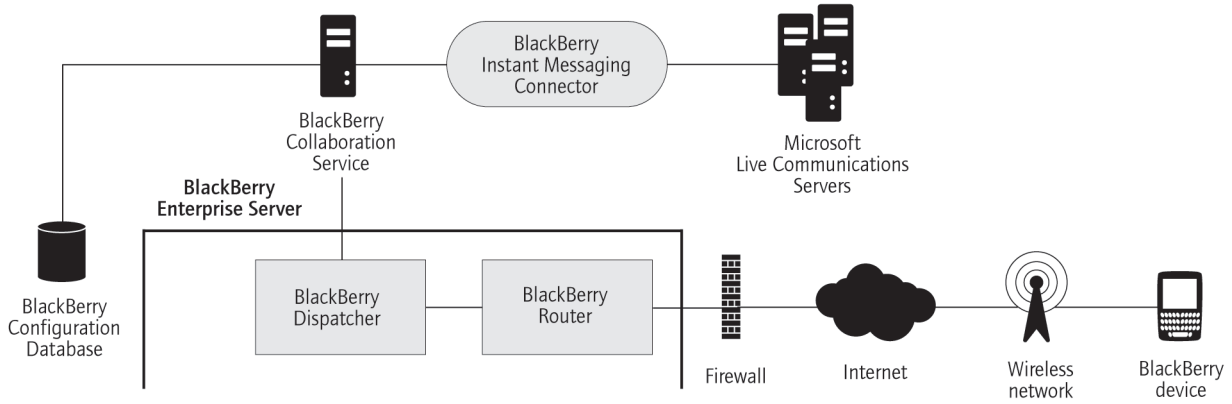
1. A user performs a contact lookup on a BlackBerry® device.
2. The BlackBerry device assigns a RefId to the search request, compresses and encrypts the request, and sends the request to the BlackBerry® Enterprise Server over port 3101.
3. The BlackBerry Dispatcher decrypts and decompresses the request with the master encryption key of the BlackBerry device, and sends the request to the BlackBerry Messaging Agent.
4. The BlackBerry Messaging Agent searches the GAL on the Microsoft® Exchange server and retrieves the 20 closest matches to the contact lookup request.

   The BlackBerry Messaging Agent sends the contact lookup results to the BlackBerry Dispatcher.
5. The BlackBerry Dispatcher encrypts the results with the master encryption key of the BlackBerry device, compresses the encrypted data, and sends it to the BlackBerry Router for delivery to the BlackBerry device.
6. The BlackBerry Router sends the encrypted data to the wireless network over port 3101.
7. The wireless network verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network, and sends the encrypted data to the BlackBerry device.
8. The BlackBerry device sends a delivery confirmation to the BlackBerry Dispatcher, which sends it to the BlackBerry Messaging Agent.

   If the BlackBerry Enterprise Server does not receive a delivery confirmation within four hours, it resubmits the contact lookup results to the wireless network.
9. The BlackBerry device decrypts and decompresses the contact lookup results with the master encryption key so that the user can view them on the BlackBerry device or add them to the contact list on the BlackBerry device.

Instant messaging process flows

Process flow: Starting an instant messaging session using the BlackBerry Client for use with Microsoft Office Live Communications Server 2005 (Windows Messenger)



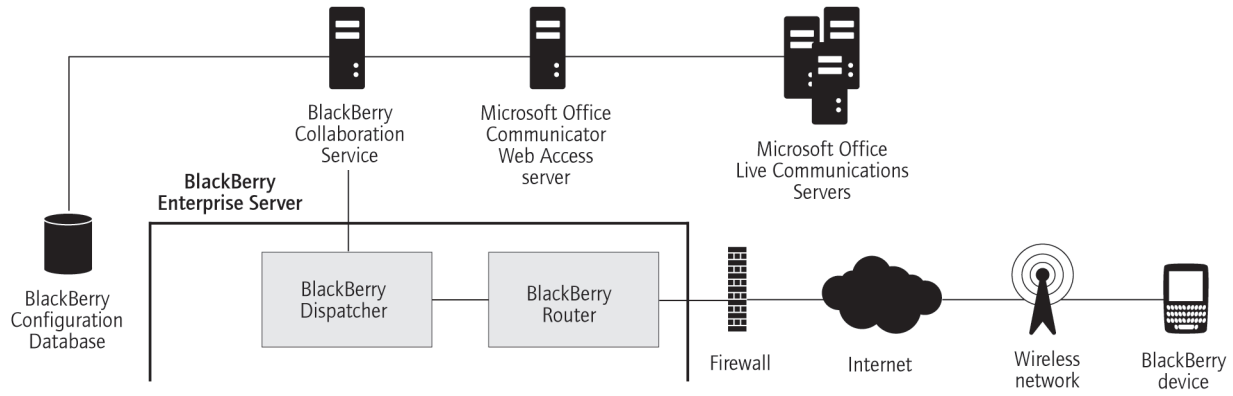
1. A user logs in to a collaboration client on a BlackBerry® device.
2. The BlackBerry device compresses and encrypts the user ID and password and sends them through the BlackBerry Router to the BlackBerry Dispatcher over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry Collaboration Service over port 3200. If the BlackBerry Collaboration Service is located on a remote computer, the request remains encrypted using a Research In Motion proprietary protocol.
4. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to find out if the maximum number of instant messaging sessions has been reached, and performs one of the following actions:
   - If the maximum number of sessions has been reached and a timeout limit is set, the BlackBerry Collaboration Service logs out any instant messaging sessions on BlackBerry devices that are out of coverage, and any instant messaging sessions that are no longer sending status messages to the BlackBerry Collaboration Service.
   - If there are no idle sessions, the BlackBerry Collaboration Service sends a "Server Busy" status message to the BlackBerry device and rejects the login request.
   - If the maximum number of sessions is not set and the number of sessions equals the total number that the Microsoft® Real-Time Communications API supports, the BlackBerry Collaboration Service sends a "Failed" status message to the BlackBerry device and rejects the login request.
5. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to verify that the user has permission to use the collaboration client, and places the request in the local queue for the BlackBerry Instant Messaging Connector.

6. On the computer that hosts the BlackBerry Collaboration Service, the MSMQ software version 3.0 or later sends the request in XMPP format, encrypted with AES, to the BlackBerry Instant Messaging Connector.

   The BlackBerry Collaboration Service opens the connection using TLS.
7. The BlackBerry Instant Messaging Connector creates an RTC client object for the session, which maintains an open TLS connection between the collaboration client and the Microsoft® Office Live Communications Server for the duration of the session.

   The default transport protocol is TLS. If you changed the transport protocol to TCP, it requires more dedicated connections for each session and supports fewer sessions.
8. The BlackBerry Instant Messaging Connector returns the acceptance to the local queue on the BlackBerry Collaboration Service.
9. The BlackBerry Collaboration Service returns the acceptance, in encrypted and compressed format, through the BlackBerry Dispatcher to the BlackBerry device, and creates a cache of the connectivity information to maintain the new instant messaging session.
10. The collaboration client on the BlackBerry device starts the instant messaging session using the RTC connection object.

Process flow: Starting an instant messaging session using the BlackBerry Client for use with Microsoft Office Live Communications Server 2005 (Microsoft Office Communicator)



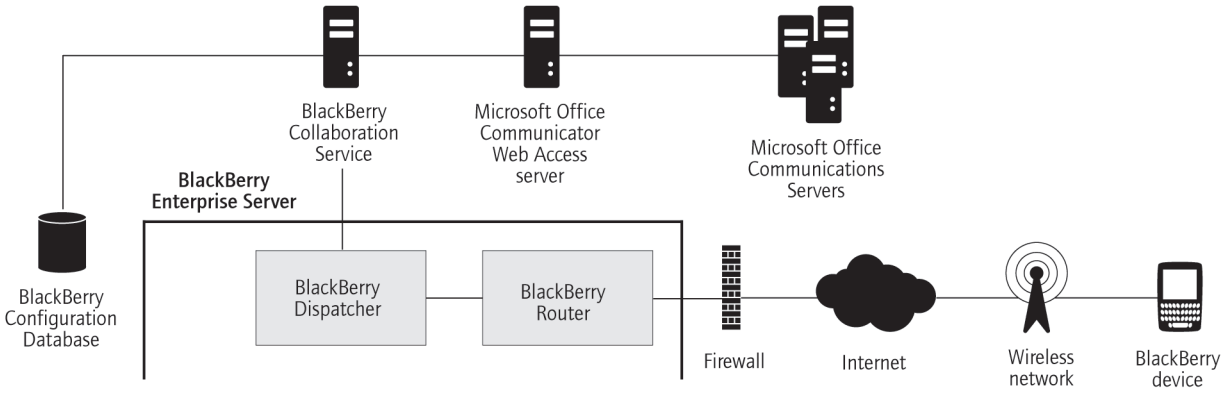
1. A user logs in to a collaboration client on a BlackBerry® device.
2. The BlackBerry device compresses and encrypts the user ID and password, and sends them through the BlackBerry Router to the BlackBerry Dispatcher over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry Collaboration Service over port 3200. If the BlackBerry Collaboration Service is located on a remote computer, the request remains encrypted using a Research In Motion proprietary protocol.

4. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to find out if the maximum number of sessions has been reached, and performs one of the following actions:
   - If the maximum number of sessions has been reached and a timeout limit is set, the BlackBerry Collaboration Service logs out any instant messaging sessions on BlackBerry devices that are out of coverage, and any instant messaging sessions that are no longer sending status messages to the BlackBerry Collaboration Service.
   - If there are no idle sessions, the BlackBerry Collaboration Service sends a "Server Busy" status message to the BlackBerry device and rejects the login request.
   - If the maximum number of sessions is not set and the number of sessions equals the total number that the HTTP persistent connection supports, the BlackBerry Collaboration Service sends a "Failed" status message to the BlackBerry device and rejects the login request.
5. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to verify that the user has permission to use the collaboration client, and tries to authenticate the user using Integrated Windows® Authentication; if the authentication is not successful, the BlackBerry Collaboration Service tries a forms-based login process instead. The BlackBerry Collaboration Service sends a login request in JSON, a lightweight data-interchange format, to the Microsoft® Office Communicator Web Access server.

   The BlackBerry Collaboration Service opens the connection using HTTPS over port 443. The administrator can also configure the connection to use HTTP, the transport protocol that the AJAX service uses, or a custom port number.
6. The Microsoft Office Communicator Web Access server formats the request using a Microsoft API and sends the request to the Microsoft® Office Live Communications Server over an MTLS connection.
7. The Microsoft Office Live Communications Server accepts the request, processes the login information, and sends the acceptance to the Microsoft Office Communicator Web Access server.
8. The Microsoft Office Communicator Web Access server sends the acceptance to the BlackBerry Collaboration Service.
9. The BlackBerry Collaboration Service sends the acceptance, in encrypted and compressed format, through the BlackBerry Dispatcher to the BlackBerry device, and creates a cache of the connectivity information to maintain the new instant messaging session.
10. The collaboration client on the BlackBerry device starts the session using an open GET request over the HTTPS persistent connection.

The BlackBerry Collaboration Service receives server-initiated events from the Microsoft Office Communicator Web Access server using an HTTP GET or HTTPS GET request, and sends these events to the collaboration client over this session. The BlackBerry Collaboration Service sends events that the BlackBerry device initiates to the Microsoft Office Communicator Web Access server using an HTTP POST or HTTPS POST request.

Process flow: Starting an instant messaging session using the BlackBerry Client for use with Microsoft Office Communications Server 2007



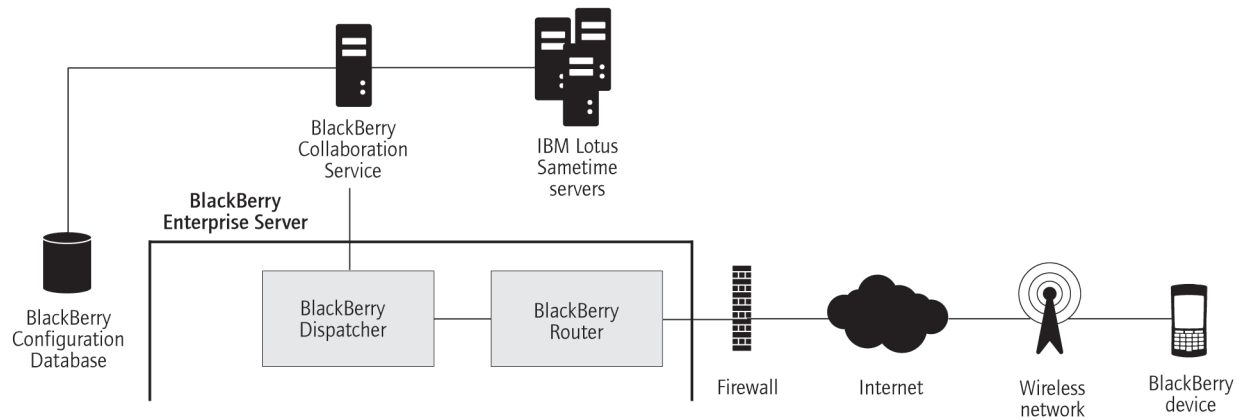
1. A user logs in to a collaboration client on a BlackBerry® device.
2. The BlackBerry device compresses and encrypts the user ID and password, and sends them through the BlackBerry Router to the BlackBerry Dispatcher over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry Collaboration Service over port 3200. If the BlackBerry Collaboration Service is located on a remote computer, the request remains encrypted using a Research In Motion proprietary protocol.
4. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to find out if the maximum number of sessions has been reached, and performs one of the following actions:
   - If the maximum number of sessions has been reached and a timeout limit is set, the BlackBerry Collaboration Service logs out any instant messaging sessions on BlackBerry devices that are out of coverage, and any instant messaging sessions that are no longer sending status messages to the BlackBerry Collaboration Service.
   - If there are no idle sessions, the BlackBerry Collaboration Service sends a "Server Busy" status message to the BlackBerry device and rejects the login request.
   - If the maximum number of sessions is not set and the number of sessions equals the total number that the HTTP persistent connection supports, the BlackBerry Collaboration Service sends a "Failed" status message to the BlackBerry device and rejects the login request.
5. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to verify that the user has permission to use the collaboration client, and tries to authenticate the user using Integrated Windows® Authentication; if the authentication is not successful, the BlackBerry Collaboration Service tries a forms-based login process instead. The BlackBerry Collaboration Service sends a login request in XML format to the Microsoft® Office Communicator Web Access Server.

The BlackBerry Collaboration Service opens the connection using HTTPS over port 443. The administrator can also configure the connection to use HTTP, the transport protocol that the AJAX service uses, or a custom port number.

6. The Microsoft Office Communicator Web Access server formats the request using a Microsoft API and sends the request to the Microsoft® Office Live Communications Server over an MTLS connection.
7. The Microsoft Office Live Communications Server accepts the request, processes the login information, and sends the acceptance to the Microsoft Office Communicator Web Access server.
8. The Microsoft Office Communicator Web Access server sends the acceptance to the BlackBerry Collaboration Service.
9. The BlackBerry Collaboration Service sends the acceptance, in encrypted and compressed format, through the BlackBerry Dispatcher to the BlackBerry device, and creates a cache of the connectivity information to maintain the new instant messaging session.
10. The collaboration client on the BlackBerry device starts the session using an open GET request over the HTTPS persistent connection.

The BlackBerry Collaboration Service receives server-initiated events from the Microsoft Office Communicator Web Access server using an HTTP GET or HTTPS GET request, and sends these events to the collaboration client over this session. The BlackBerry Collaboration Service sends events that the BlackBerry device initiates to the Microsoft Office Communicator Web Access server using an HTTP POST or HTTPS POST request.

Process flow: Starting an instant messaging session using the BlackBerry Client for IBM Lotus Sametime

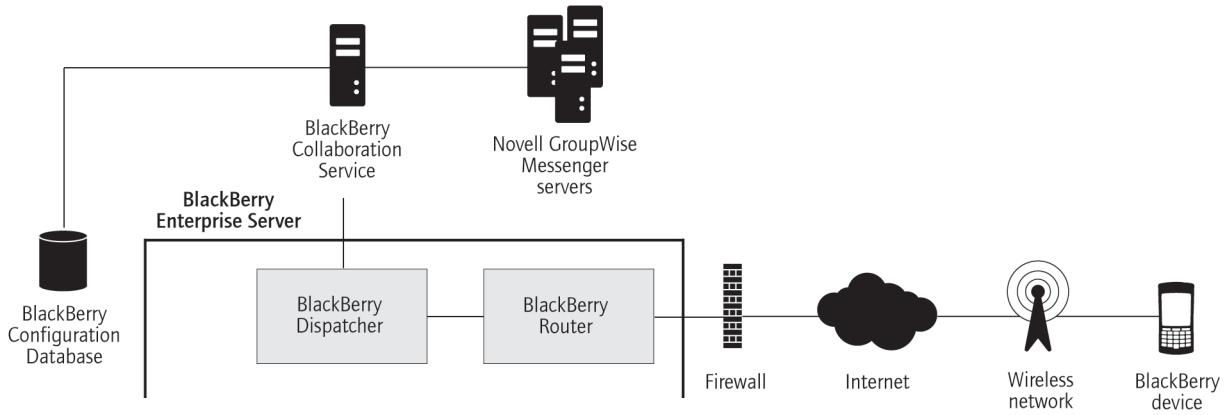


1. A user logs in to a collaboration client on a BlackBerry® device.
2. The BlackBerry device compresses and encrypts the user ID and password, and sends them through the BlackBerry Router to the BlackBerry Dispatcher over port 3101.

3. The BlackBerry Dispatcher sends the request to the BlackBerry Collaboration Service over port 3200. If the BlackBerry Collaboration Service is located on a remote computer, the request remains encrypted using a Research In Motion proprietary protocol.
4. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to find out if the maximum number of sessions has been reached, and performs one of the following actions:
   - If the maximum number of sessions has been reached and a timeout limit is set, the BlackBerry Collaboration Service logs out any instant messaging sessions on BlackBerry devices that are out of coverage, and any instant messaging sessions that are no longer sending status messages to the BlackBerry Collaboration Service.
   - If there are no idle sessions, the BlackBerry Configuration Database sends a "Server Busy" status message to the BlackBerry device and rejects the login request.
   - If the maximum number of sessions is not set and the number of sessions equals the total number that the IBM® Lotus® Sametime® API supports, the BlackBerry Configuration Database sends a "Failed" status message to the BlackBerry device and rejects the login request.
5. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to verify that the user has permission to use the collaboration client, and connects to the IBM Lotus Sametime server. The BlackBerry Collaboration Service starts an encrypted proxy connection over TCP/IP using the IBM Lotus Sametime API, reformats the request from the RIM proprietary protocol format into one that the IBM Lotus Sametime API supports, and sends the request.

   By default, the BlackBerry Collaboration Service starts the connection over port 1533 unless you specify a custom port number.
6. The IBM Lotus Sametime server accepts the login request from the BlackBerry device, starts a dedicated TCP/IP connection for the session, and starts listening for requests from the BlackBerry device for that session.
7. The BlackBerry Collaboration Service sends the acceptance, in encrypted and compressed format, through the BlackBerry Dispatcher to the BlackBerry device, and creates a cache of the connectivity information to maintain the new instant messaging session.

Process flow: Starting an instant messaging session using the BlackBerry Client for Novell GroupWise Messenger

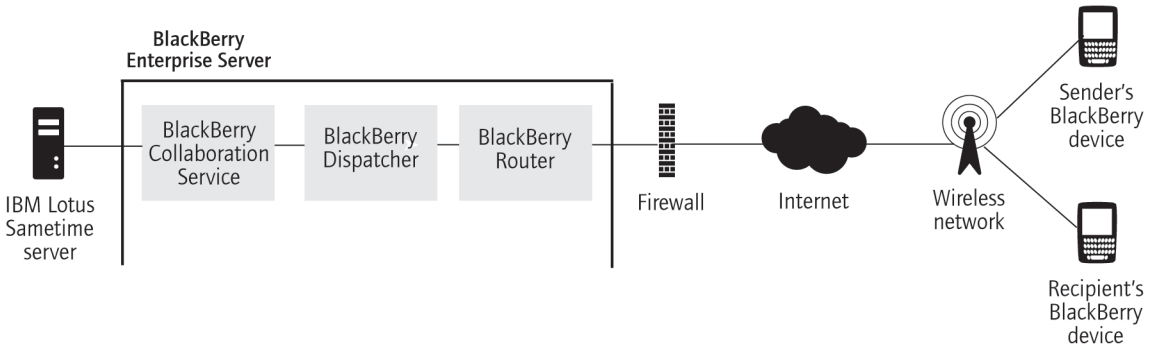


1. A user logs in to a collaboration client on a BlackBerry® device.
2. The BlackBerry device compresses and encrypts the user ID and password and sends them through the BlackBerry Router to the BlackBerry Dispatcher over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry Collaboration Service over port 3200. If the BlackBerry Collaboration Service is located on a remote computer, the request remains encrypted using a Research In Motion proprietary protocol.
4. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to find out if the maximum number of sessions has been reached, and performs one of the following actions:
   - If the maximum number of sessions has been reached and a timeout limit is set, the BlackBerry Collaboration Service logs out any instant messaging sessions on BlackBerry devices that are out of coverage, and any instant messaging sessions that are no longer sending status messages to the BlackBerry Collaboration Service.
   - If there are no idle sessions, the BlackBerry Configuration Database sends a "Server Busy" status message to the BlackBerry device and rejects the login request.
   - If the maximum number of sessions is not set and the number of sessions equals the total number that the Novell® GroupWise® protocol supports, the BlackBerry device sends a "Failed (300)" status message to the BlackBerry device and rejects the login request.
5. The BlackBerry Collaboration Service checks the BlackBerry Configuration Database to verify that the user has permission to use the collaboration client, and connects to the Novell® GroupWise® Messenger server.

   The BlackBerry Collaboration Service starts an encrypted proxy (SSL) connection using the Novell GroupWise protocol and sends the request. By default, the BlackBerry Collaboration Service opens this connection over port 8300, but it can also open this connection over a custom port number.

6. The Novell GroupWise Messenger server accepts the login request from the BlackBerry device, opens a dedicated SSL connection for the session, and starts listening for requests from the BlackBerry device.
7. The BlackBerry Collaboration Service sends the acceptance, in encrypted and compressed format, through the BlackBerry Dispatcher to the BlackBerry device, and creates a cache of the connectivity information to maintain the new instant messaging session.

Process flow: Sending a file to a contact using the BlackBerry Client for IBM Lotus Sametime



1. A user opens a conversation with a contact, clicks Send File on the menu, and selects a file to send to the contact.
2. The BlackBerry® Client for IBM® Lotus® Sametime® creates an invitation request and sends it to the BlackBerry Collaboration Service.
3. The BlackBerry Collaboration Service checks the size of the file to verify that it does not exceed the maximum file size that is configured on the BlackBerry® Enterprise Server, associates the file extension and the conversation ID with the invitation request, and sends the request to the IBM® Lotus® Sametime® server.
4. The IBM Lotus Sametime server checks the size of the file to verify that it does not exceed the maximum file size that is configured on the IBM Lotus Sametime server (by default, 1 MB), associates the file with the conversation that is open between the sender and the recipient, and sends the request to the BlackBerry Collaboration Service.
5. The BlackBerry Collaboration Service converts the request into an instant messaging invitation and sends it to the client on the recipient's BlackBerry device.
6. In the conversation window on the recipient's client, the recipient receives a request to accept or decline the file. The recipient can also select an option to optimize the file for viewing on the BlackBerry device.

   The BlackBerry Collaboration Service can optimize files for viewing on the BlackBerry device only if it has access to the BlackBerry Attachment Service in your organization's environment.
7. The recipient accepts the request.

   If the recipient selected the optimize option, the file will be downloaded to the memory of the BlackBerry device. If the recipient did not select the optimize option, the client prompts the recipient to save the file to a location in the file system on the BlackBerry device.

8. The recipient's client sends a content request packet to the BlackBerry Collaboration Service.
9. The BlackBerry Collaboration Service requests the file size from the IBM Lotus Sametime server, and sends data to the IBM Lotus Sametime server to begin the file transfer process.

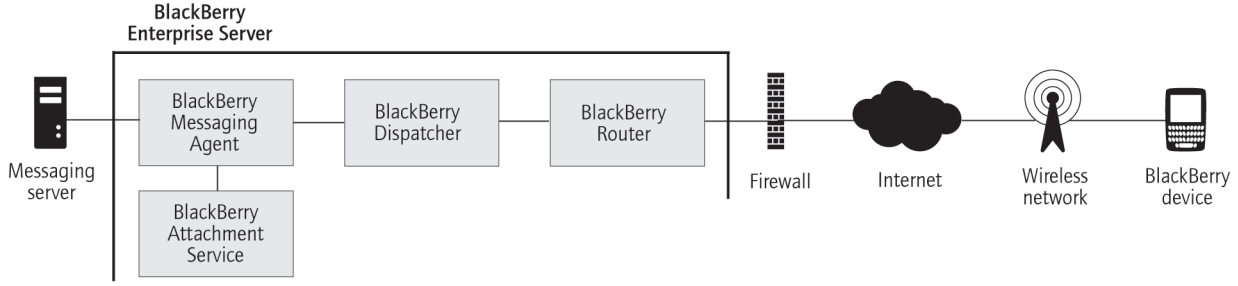
   The media transfer state on the BlackBerry Collaboration Service is set to transfer.
10. The sender's client sends the data for the file in content message packets to the BlackBerry Collaboration Service.
11. The BlackBerry Collaboration Service checks the order of the content message packets and sends them to the recipient's client using a BlackBerry instant messaging protocol.
12. The recipient's client receives the first content message packet, sends an acknowledgement message to the BlackBerry Collaboration Service, and requests the next content message packet from the BlackBerry Collaboration Service. This continues until the client receives all of the content message packets.

    If the recipient selected the option to optimize the file for viewing, the BlackBerry Attachment Service converts the file into a format that is optimized for viewing on the BlackBerry device.
13. When the BlackBerry Collaboration Service receives an acknowledgement message for the last content message packet from the recipient's client, it changes its media transfer state to done and stops the file transfer process on the IBM Lotus Sametime server.
14. In the conversation window, the client notifies the recipient that the file has been received.

    The recipient can open the file from the conversation window or from the file system on the BlackBerry device. The BlackBerry device uses the BlackBerry® Browser to render supported files. If the recipient selected the option to optimize the file for viewing, the recipient can open and view supported files in the attachment viewer on the BlackBerry device. The recipient can also save the optimized file to a location in the file system on the BlackBerry device.

Message attachment process flows

Process flow: Viewing a message attachment



1. A user receives a message with an attachment on a BlackBerry® device.
2. The BlackBerry Messaging Agent verifies that the format of the attachment is valid for conversion.

If the format is not valid and the user's BlackBerry device is Java® based, the Open Attachment menu item does not appear on the user's BlackBerry device.

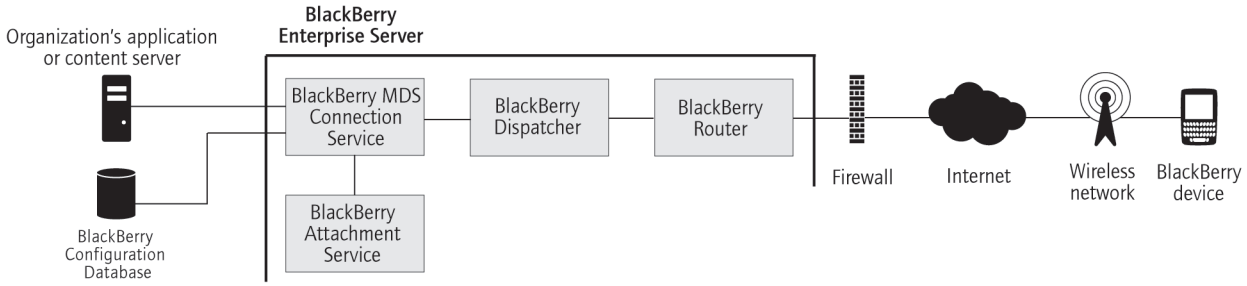
3. The user clicks the Open Attachment menu item to view the attachment on the BlackBerry device.
4. The attachment viewer sends the request to the BlackBerry Messaging Agent, which connects to the BlackBerry Attachment Service over port 1900.
5. The BlackBerry Attachment Service retrieves the attachment in binary format from the user's message store using the BlackBerry Messaging Agent link to the messaging server.

   The BlackBerry Attachment Service distills the attachment and extracts the content, layout, appearance, and navigation information from it.
6. The BlackBerry Attachment Service organizes, stores, and links the information in a proprietary DOM in a binary XML style.

   The BlackBerry Attachment Service formats the attachment for the BlackBerry device and converts it to UCS format. The formatting is based on the request for content (for example, page and paragraph information, or search words) and the available BlackBerry device information (for example, screen size, display, or available space).
7. The BlackBerry Attachment Service sends the UCS data to the BlackBerry Messaging Agent using a TCP/IP connection over port 1900.
8. The BlackBerry Messaging Agent sends the converted attachment to the BlackBerry Dispatcher.
9. The BlackBerry Dispatcher compresses the first portion of the attachment, encrypts it with the master encryption key of the BlackBerry device, and sends the first portion of the attachment to the BlackBerry Router.
10. The BlackBerry Router sends the first portion of the attachment to the wireless network over port 3101, which verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network.
11. The wireless network delivers the attachment to the BlackBerry device.

    The BlackBerry device sends a delivery confirmation to the BlackBerry Dispatcher, which sends it to the BlackBerry Messaging Agent. If the BlackBerry® Enterprise Server does not receive a delivery confirmation within 4 hours, it sends the attachment data to the wireless network again.
12. The BlackBerry device uses its master encryption key to decrypt and decompress the attachment so that the user can view it.
13. The user views the attachment on the BlackBerry device by selecting a section from the table of contents, or by viewing the full attachment. The original formatting of the attachment, including indents, tables, fonts, and bullets, is reflected on the BlackBerry device.

Process flow: Viewing an attachment through a link



1. A user clicks the Get Link menu item to view an attachment on a BlackBerry® device.
2. The BlackBerry device sends the request to the BlackBerry® Enterprise Server over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry MDS Connection Service over port 3200.
4. The BlackBerry MDS Connection Service creates an HTTP session for the user and sends the request to the web server.

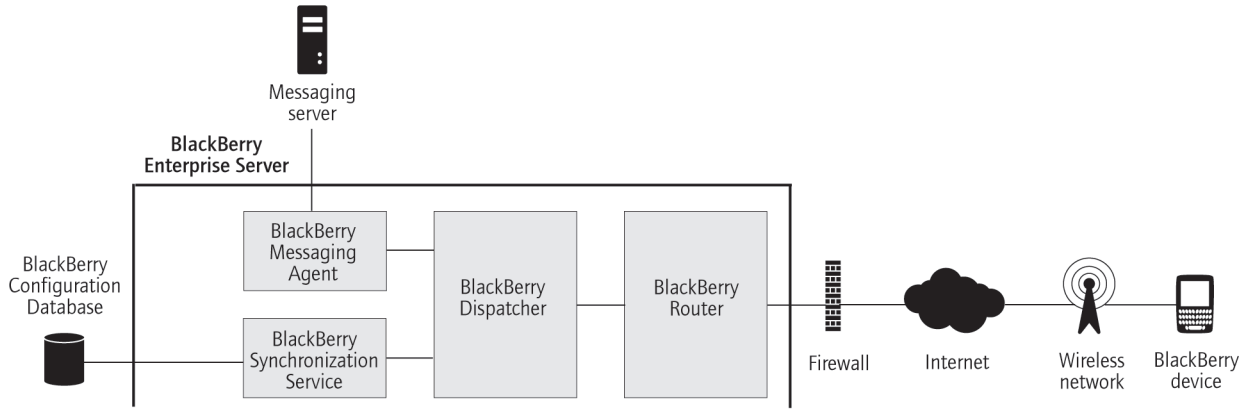
   The BlackBerry MDS Connection Service retrieves the requested content and sends it to the BlackBerry Attachment Service.
5. The BlackBerry Attachment Service extracts the content, layout, appearance, and navigation information from the attachment, and organizes, stores, and links the information in a proprietary DOM in a binary XML style.
6. The BlackBerry Attachment Service formats the attachment for the BlackBerry device and converts it to UCS format.

   The formatting is based on the request for content (for example, page and paragraph information, or search words) and the available BlackBerry device information (for example, screen size, display, or available space).
7. The BlackBerry Attachment Service sends the converted attachment to the BlackBerry MDS Connection Service using HTTP.
8. The BlackBerry MDS Connection Service sends the first 250 KB of content to the BlackBerry Dispatcher over port 3200.
9. The BlackBerry Dispatcher compresses the content, encrypts it with the master encryption key of the BlackBerry device, and sends the content to the BlackBerry Router.
10. The BlackBerry Router sends the content to the BlackBerry device.
11. The BlackBerry device uses its master encryption key to decrypt and decompress the attachment so that the user can view it.
12. The user views the attachment on the BlackBerry device using the browser plug-in for the attachment viewer.

    The attachment viewer processes 3 KB at a time.

Organizer data process flows

Process flow: Synchronizing organizer data for the first time on a BlackBerry device



1. A user activates a new BlackBerry® device or upgrades an existing BlackBerry device and receives the service book for the BlackBerry Synchronization Service.
2. The BlackBerry device requests the synchronization configuration information from the BlackBerry Synchronization Service.

   The configuration information indicates whether wireless data synchronization on the BlackBerry® Enterprise Server is turned on, and which database can be synchronized. The configuration information also provides database synchronization types and conflict resolution settings. All data that the BlackBerry device and the BlackBerry Enterprise Server send between them is compressed and encrypted.
3. The BlackBerry Synchronization Service returns the configuration information and synchronizes the databases using that information.

   A synchronization agent on the BlackBerry device tracks which databases can be synchronized over the wireless network. If data already exists on both the BlackBerry device and the BlackBerry Enterprise Server, the BlackBerry Synchronization Service merges, adds, or updates the records during the synchronization process. If data exists on only the BlackBerry device or the BlackBerry Enterprise Server, the BlackBerry Synchronization Service restores the data from that location. The BlackBerry device and the BlackBerry Enterprise Server do not delete records during the initial synchronization process.

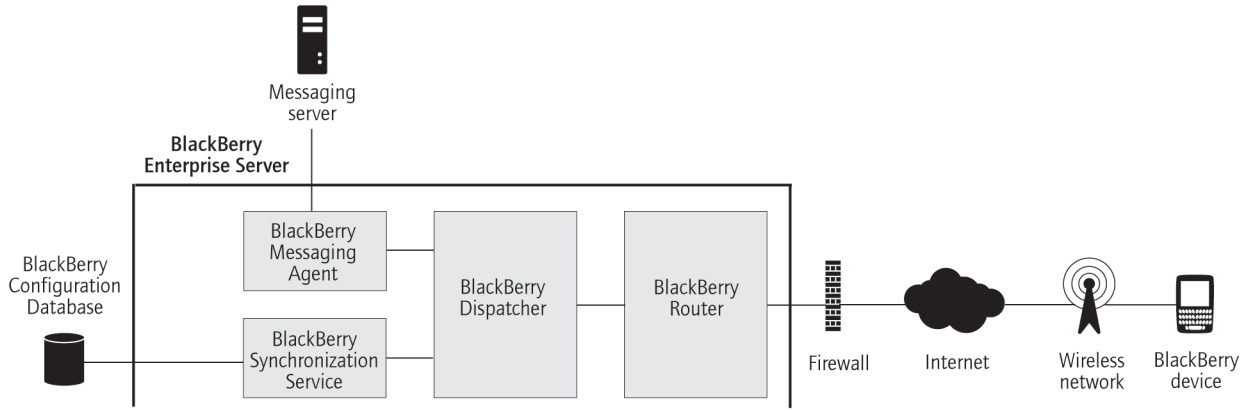
   After the BlackBerry Synchronization Service registers a database for wireless data synchronization, it can no longer be synchronized or restored using the BlackBerry® Desktop Software.

The initial synchronization process is complete when the data on the BlackBerry device and the data on the BlackBerry Enterprise Server are synchronized. Future changes on the BlackBerry device or the BlackBerry Enterprise Server are synchronized over the wireless network.

If the user changes data on the BlackBerry device or in the organizer application on the user's computer during the initial synchronization process, the BlackBerry Synchronization Service synchronizes the changes after the initial synchronization successfully completes.

If the user connects the BlackBerry device to a computer that is running the BlackBerry® Device Manager, the initial synchronization can occur over the connection to the BlackBerry Router instead of over the wireless network.

Process flow: Synchronizing subsequent changes to organizer data



1. A user saves a change to the organizer data or the BlackBerry® device settings (for example, a new AutoText entry) on a BlackBerry device or in the organizer application on the user's computer.
2. Based on where the user made the change, the BlackBerry device or the BlackBerry® Enterprise Server adds the change to a changelist and sends the changelist to the BlackBerry Synchronization Service.

   The changelist includes target database and record information for the organizer application.
3. The BlackBerry Synchronization Service sends a change to organizer data over the wireless network, along with other entries in the changelist for that user.

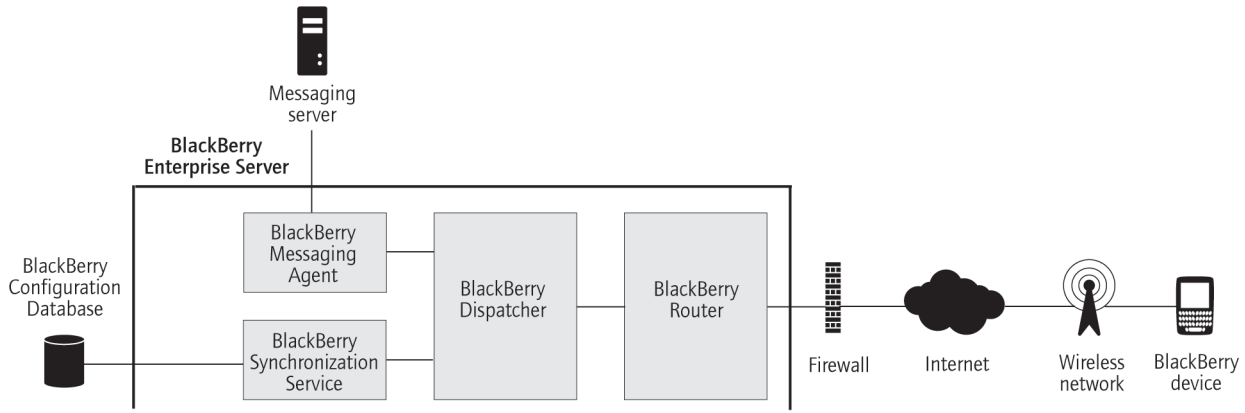
   The BlackBerry Synchronization Service sends other changes, including BlackBerry device information, time zone information, and backup and restore data, at the batch synchronization interval that is set on the BlackBerry Enterprise Server. By default, the batch synchronization interval is 10 minutes.

   To prevent synchronization errors, the BlackBerry Enterprise Server and the BlackBerry device can send only a single changelist at a time for a user account.
4. The BlackBerry Synchronization Service writes a synchronization request entry to the SynchRequest table of the BlackBerry Configuration Database, and sends the changed records to the BlackBerry Dispatcher.
5. The BlackBerry Dispatcher compresses the content, encrypts it with the master encryption key of the BlackBerry device, and sends the content to the BlackBerry Router for delivery to the BlackBerry device.

6. The BlackBerry device sends a delivery confirmation to the BlackBerry Synchronization Service for each record that it receives.
7. The BlackBerry Synchronization Service receives delivery confirmations and deletes the corresponding synchronization request entries from the SyncRequest table, and writes an entry to the SyncRecordState table for each delivery confirmation.

   Each organizer database record has a unique identifier that is mapped to a corresponding record on the BlackBerry device.

Process flow: Adding a contact picture on a BlackBerry device



1. A user adds a picture to a contact in the address book on a BlackBerry® device and saves the change.
2. The BlackBerry device creates a changelist request to synchronize the changed record. The changelist request includes the updated record information and identifies the address book as the target for the update.

   The BlackBerry device compresses and encrypts the request, and sends the request to the BlackBerry Dispatcher over port 3101.
3. The BlackBerry Dispatcher uses the master encryption key of the BlackBerry device to decrypt and decompress the request, and sends the request to the BlackBerry Synchronization Service.
4. The BlackBerry Synchronization Service receives the changelist request, writes a synchronization request entry in the SynchRequest table of the BlackBerry Configuration Database, and sends the changed record to the BlackBerry Dispatcher.
5. The BlackBerry Dispatcher sends the changed record, in XML format, to the BlackBerry Messaging Agent.

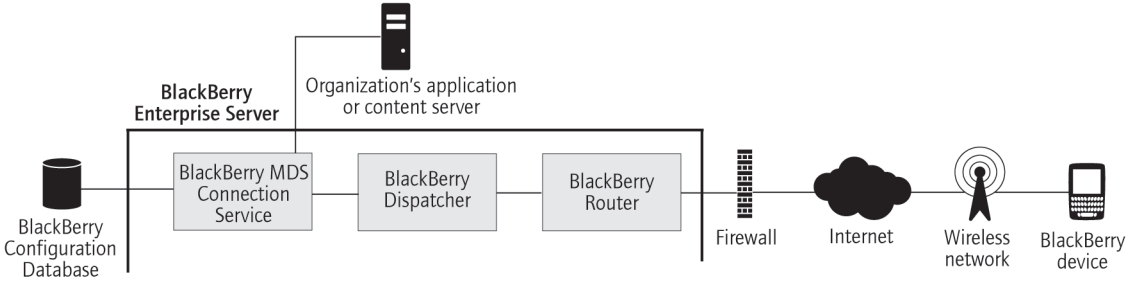
   If the file size of the picture exceeds 32 KB, the BlackBerry Messaging Agent rejects the synchronization request.
6. The BlackBerry Messaging Agent sends the changed record to the messaging server.
7. The messaging server updates the user's personal contact list.

8. The BlackBerry Messaging Agent sends a delivery confirmation to the BlackBerry Dispatcher.
9. The BlackBerry Dispatcher sends the delivery confirmation to the BlackBerry Synchronization Service.
10. The BlackBerry Synchronization Service deletes the synchronization request entry from the SyncRequest table, writes an entry in the SyncRecordState table, and sends the delivery confirmation to the BlackBerry Dispatcher.
11. The BlackBerry Dispatcher encrypts the results with the master encryption key of the BlackBerry device, compresses them, and sends the results to the BlackBerry Router.
12. The BlackBerry Router sends the results to the wireless network over port 3101.
13. The wireless network verifies that the PIN belongs to a valid BlackBerry device and sends the delivery confirmation to the BlackBerry device.

    If the BlackBerry device does not receive the delivery confirmation from the wireless network within 20 minutes, it sends the synchronization request to the wireless network again. If the BlackBerry device does not receive the delivery confirmation within 8 hours, it stops resending the synchronization request to the wireless network.

Mobile data process flows

Process flow: Requesting BlackBerry Browser content on a BlackBerry device



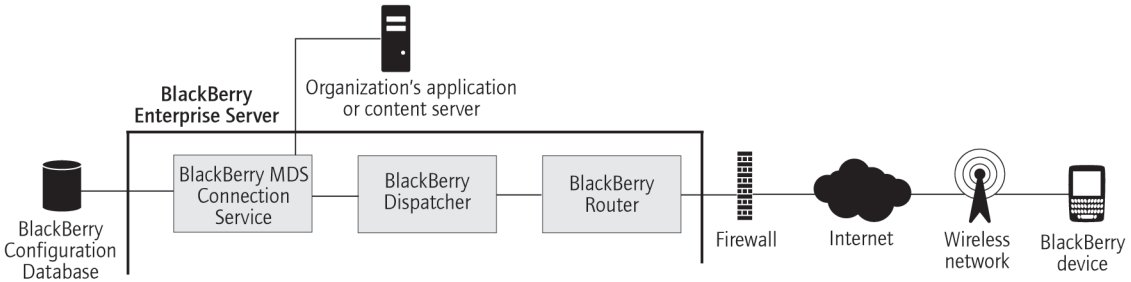
1. A user requests Internet or intranet content from the organization's content server using the BlackBerry® Browser on a BlackBerry device.
2. The BlackBerry device sends the request to the BlackBerry® Enterprise Server over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry MDS Connection Service over port 3200.
4. The BlackBerry MDS Connection Service creates an HTTP session for the user and retrieves the requested Internet or intranet content from the content server.

   The BlackBerry MDS Connection Service converts the content so that the user can view it on the BlackBerry device, and sends the content to the BlackBerry Dispatcher over port 3200.
5. The BlackBerry Dispatcher compresses the content, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.

6. The BlackBerry Router sends the encrypted content to the wireless network over port 3101.
7. The wireless network verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network and sends the encrypted content to the BlackBerry device.
8. The BlackBerry device sends a delivery confirmation to the BlackBerry Router, and decrypts and decompresses the content so that the user can view it in the BlackBerry Browser.

   If the BlackBerry MDS Connection Service does not receive a delivery confirmation within the flow control timeout limit, it sends a message to the wireless network to delete the pending content.

Process flow: Requesting BlackBerry Browser content while access control is turned on for the BlackBerry MDS Connection Service



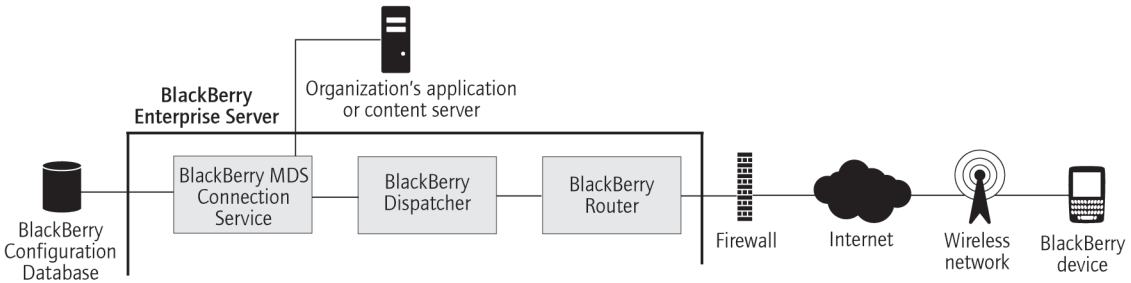
1. A user requests Internet or intranet content from the organization's content server using the BlackBerry® Browser on a BlackBerry device.
2. The BlackBerry device sends the request to the BlackBerry® Enterprise Server over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry MDS Connection Service over port 3200.
4. The BlackBerry MDS Connection Service checks the BlackBerry Configuration Database to verify whether pull authorization is turned on, and whether the user has permission to pull content from the specified content server.

   If the user does not have permission to pull content from the specified content server, the BlackBerry MDS Connection Service rejects the request and sends an error message to the BlackBerry device.
5. The BlackBerry MDS Connection Service creates an HTTP session for the user and sends the user's authentication credentials to the content server. If the user authenticates successfully, the BlackBerry MDS Connection Service sends the HTTP request to the content server. If the user does not authenticate successfully, the BlackBerry Browser displays an "HTTP 403 Error" message, and prompts the user to type the correct credentials.
6. The BlackBerry MDS Connection Service retrieves the content from the content server, converts it so that the user can view it on the BlackBerry device, and sends it to the BlackBerry Dispatcher over port 3200.
7. The BlackBerry Dispatcher compresses the content, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.
8. The BlackBerry Router sends the encrypted content to the wireless network over port 3101.

9. The wireless network verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network and sends the encrypted content to the BlackBerry device.
10. The BlackBerry device sends a delivery confirmation to the BlackBerry Router, and decrypts and decompresses the content so that the user can view it in the BlackBerry Browser.

    If the BlackBerry MDS Connection Service does not receive a delivery confirmation within the flow control timeout limit, it sends a message to the wireless network to delete the pending content.

Process flow: Requesting BlackBerry Browser content with two-factor authentication turned on



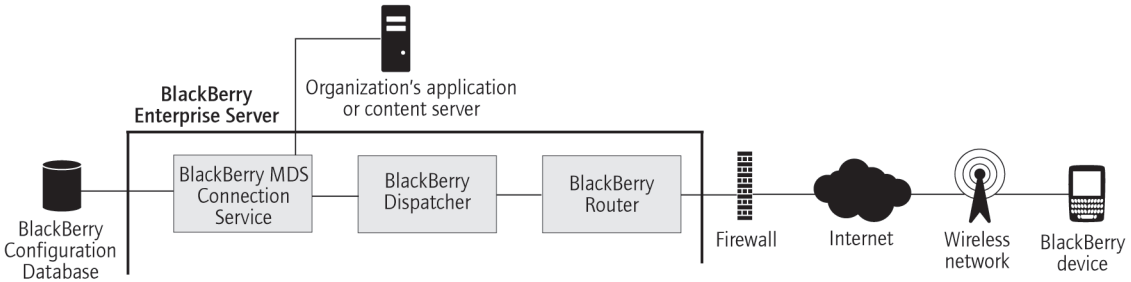
1. A user requests Internet or intranet content from the organization's content server using the BlackBerry® Browser on a BlackBerry device.
2. The BlackBerry device sends the request to the BlackBerry® Enterprise Server over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry MDS Connection Service over port 3200.
4. The BlackBerry MDS Connection Service checks whether the user's BlackBerry device is running an authenticated connection that can support the content request.

   If the BlackBerry device is not running an authenticated connection, the BlackBerry MDS Connection Service redirects the user to a login web page. If the user logs in successfully, using an RSA SecurID® user name and passcode, the BlackBerry MDS Connection Service creates a connection to the content server. By default, the BlackBerry device caches the user's credentials for 24 hours of activity on the authenticated connection, or 60 minutes of inactivity.
5. The BlackBerry MDS Connection Service creates an HTTP session for the user and retrieves the Internet or intranet content from the content server. The BlackBerry MDS Connection Service converts the content so that the user can view it on the BlackBerry device, and sends the content to the BlackBerry Dispatcher over port 3200.
6. The BlackBerry Dispatcher compresses the content, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.
7. The BlackBerry Router sends the encrypted content to the wireless network over port 3101.
8. The wireless network verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network and sends the encrypted content to the BlackBerry device.

9. The BlackBerry device sends a delivery confirmation to the BlackBerry Router, and decrypts and decompresses the content so that the user can view it in the BlackBerry Browser.

   If the BlackBerry MDS Connection Service does not receive a delivery confirmation within the flow control timeout limit, it sends a message to the wireless network to delete the pending content.

Process flow: Pushing application content to a BlackBerry device



1. A push application on an application server or content server behind the organization's firewall sends an HTTP POST request to a central push server over the listen port for the content server. The default port number is 8080.

   One or more instances of the BlackBerry® MDS Connection Service in a BlackBerry Domain can be defined as a central push server. A push application specifies the BlackBerry® Enterprise Server host name and the connection port number that the BlackBerry MDS Connection Service listens on.
2. The central push server checks the BlackBerry Configuration Database for the following information about the intended recipients of the application content: the PINs that are associated with the users, whether the users' PINs are enabled for the BlackBerry MDS Connection Service, and the active BlackBerry Enterprise Server instances that the users are located on.

   Users who do not appear in the BlackBerry Configuration Database, or whose accounts are pending deletion, cannot receive the push content.
3. The central push server responds to the push application to acknowledge that it is processing the request, and sends the push content to the active instances of the BlackBerry MDS Connection Service that are associated with the active instances of the BlackBerry Enterprise Server.
4. The BlackBerry MDS Connection Service converts the content so that it can be viewed on the user's BlackBerry device, and sends the content to the BlackBerry Dispatcher over port 3200.
5. The BlackBerry Dispatcher compresses the content, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.
6. The BlackBerry Router sends the encrypted content to the wireless network over port 3101, which verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network.
7. The wireless network sends the encrypted content to the BlackBerry device.

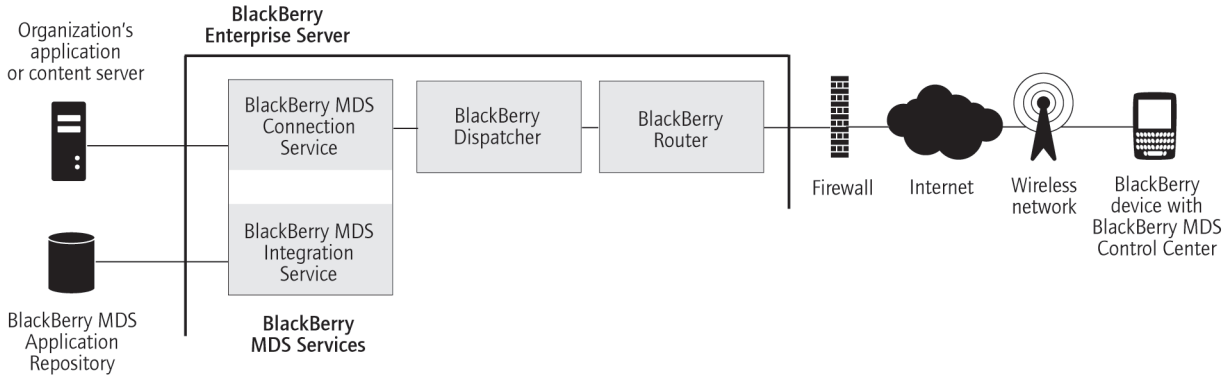
8. The BlackBerry device sends a delivery confirmation to the BlackBerry Router.

   If the BlackBerry MDS Connection Service does not receive a delivery confirmation within the flow control timeout limit, it sends a message to the wireless network to delete the pending content.

9. The BlackBerry device decrypts and decompresses the content.

   The BlackBerry Application detects the incoming content by listening on a port number that the application developer specified. For example, the BlackBerry® Browser listens for push application connections on port 7874. The application displays the content on the BlackBerry device when the user runs the application.

Process flow: Requesting BlackBerry MDS Runtime Applications from a BlackBerry device



1. A user searches for available BlackBerry® MDS Runtime Applications using the BlackBerry MDS Control Center on a BlackBerry device.
2. The BlackBerry device sends a request for a list of available applications to the BlackBerry® Enterprise Server over port 3101.
3. The BlackBerry Dispatcher sends the request to the BlackBerry MDS Connection Service over port 3200.
4. The BlackBerry MDS Connection Service sends the request to the BlackBerry MDS Integration Service.
5. The BlackBerry MDS Integration Service checks which BlackBerry MDS Runtime Applications are available in the BlackBerry MDS Application Repository, compiles a list of applications that the user can discover from the BlackBerry device, and sends the list to the BlackBerry MDS Connection Service.
6. The BlackBerry MDS Connection Service formats the list of applications so that it can be viewed on the BlackBerry device and sends it to the BlackBerry Dispatcher over port 3200.
7. The BlackBerry Dispatcher compresses the list, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.
8. The BlackBerry Router sends the list to the BlackBerry device, which decrypts and decompresses the list.

9. In the BlackBerry MDS Control Center on the BlackBerry device, the user views the list of BlackBerry MDS Runtime Applications that are available to download from the BlackBerry MDS Application Repository, and selects a BlackBerry MDS Runtime Application to install on the BlackBerry device.
10. The BlackBerry device sends the request for the BlackBerry MDS Runtime Application to the BlackBerry Dispatcher over port 3101.
11. The BlackBerry Dispatcher sends the request to the BlackBerry MDS Connection Service over port 3200.
12. The BlackBerry MDS Connection Service sends the request to the BlackBerry MDS Integration Service.
13. The BlackBerry MDS Integration Service sends the BlackBerry MDS Runtime Application content from the BlackBerry MDS Application Repository to the BlackBerry MDS Connection Service.
14. The BlackBerry MDS Connection Service converts the content so that it can be viewed on the BlackBerry device, and sends the content to the BlackBerry Dispatcher over port 3200.
15. The BlackBerry Dispatcher compresses the content, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.
16. The BlackBerry Router delivers the content to the BlackBerry device, which decrypts and decompresses it.
17. The BlackBerry MDS Runtime Application installs on the BlackBerry device automatically.
18. The BlackBerry device sends an installation confirmation to the BlackBerry MDS Integration Service.

BlackBerry device management process flows

Process flow: Activating the BlackBerry device over the wireless network

The user receives or purchases a new BlackBerry® device.

1. The user contacts your organization's IT department to activate the BlackBerry device.
2. The administrator uses the BlackBerry Manager to create a temporary activation password for the user account and communicates that password to the user. The password applies to the user account only.
3. To activate the BlackBerry device over the wireless network, the user opens the activation application on the BlackBerry device and types the appropriate email address and the activation password.
4. The BlackBerry device sends an activation request message to the email account. The message contains information about the BlackBerry device, such as routing information and the public keys for the BlackBerry device.
5. The BlackBerry® Enterprise Server sends the BlackBerry device an activation response that contains routing information about the BlackBerry Enterprise Server and the public keys for the BlackBerry Enterprise Server.
6. The BlackBerry Enterprise Server and the BlackBerry device establish a master encryption key. The BlackBerry Enterprise Server and the BlackBerry device confirm knowledge of the master encryption key to one another. If the confirmation succeeds, the activation proceeds and further communication between the BlackBerry Enterprise Server and the BlackBerry device is encrypted.

7. The BlackBerry Enterprise Server sends the IT policy to the BlackBerry device. If the BlackBerry device cannot accept the IT policy, the activation does not complete.
8. The BlackBerry Enterprise Server sends the appropriate service books (for example, the messaging service book, wireless calendar service book, browser service book, and other service books) to the BlackBerry device. The user can now send messages from and receive messages on the BlackBerry device.
9. If the user is configured for wireless synchronization, and the BlackBerry device has wireless backup and wireless calendar synchronization turned on, the BlackBerry Enterprise Server sends user data to the BlackBerry device.

Process flow: Resending an IT policy to the BlackBerry device manually

1. In the BlackBerry® Manager, the administrator clicks a user account, and then clicks **Resend IT Policy**.
2. The BlackBerry Policy Service reads the current IT policy settings of the user account from the BlackBerry Configuration Database to determine which IT policy to send to the BlackBerry device.
3. The BlackBerry Policy Service prepares to send the IT policy using the GME protocol by adding the unique identifier and version of the BlackBerry® Enterprise Server.
4. The BlackBerry Policy Service adds the unique key that the BlackBerry Domain uses to sign IT policy data packets to the IT policy data packet.
5. The BlackBerry Policy Service sends the IT policy data packet to the BlackBerry Dispatcher.
6. The BlackBerry Dispatcher encrypts the IT policy data packet with the master encryption key of the BlackBerry device, compresses the content, and then sends it to the BlackBerry Router for delivery to the BlackBerry device.
7. The BlackBerry Router sends the encrypted IT policy data packet over port number 3101 to the wireless network. The wireless network verifies that the PIN belongs to a valid BlackBerry device that is registered on the wireless network.

Process flow: Authenticating the data on a BlackBerry device without connecting to the BlackBerry Infrastructure

1. A user connects a BlackBerry® device to a computer that the BlackBerry® Device Manager is running on.
2. The BlackBerry Router uses a unique authentication protocol to verify that the user is a valid BlackBerry device user.

   This authentication sequence uses the authentication information for the BlackBerry® Enterprise Server and the BlackBerry device that the SRP authentication sequence uses to validate the BlackBerry Enterprise Server before allowing it to connect to the BlackBerry® Infrastructure. The BlackBerry Router cannot access the value of the master encryption key on the BlackBerry device and the BlackBerry Enterprise Server.
3. The BlackBerry device and the BlackBerry Router use the BlackBerry Device Manager to send data to one another over the physical connection, behind the firewall. All data that the BlackBerry device and the BlackBerry Enterprise Server send to each other is compressed and encrypted. This data bypasses the wireless network.

   The movement of wireless data over an SRP connection is restored when the user disconnects the BlackBerry device from the computer or closes the BlackBerry Device Manager.

Process flow: Sending an application to a BlackBerry device over the wireless network

1. A BlackBerry® Enterprise Server administrator adds a BlackBerry Java® Application to a network drive, and adds the BlackBerry Java Application to a user's software configuration in the BlackBerry Manager. The administrator specifies wireless delivery for the application.
2. The BlackBerry Policy Service sends the software configuration to the BlackBerry Dispatcher.
3. The BlackBerry Dispatcher compresses the data, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.
4. The BlackBerry Router sends the data to the wireless network over port 3101.
5. The wireless network verifies that the user's PIN belongs to a valid BlackBerry device that is registered with the wireless network.
6. The BlackBerry device receives and applies the updated software configuration, and compares the applications in the software configuration to the applications that are installed on the BlackBerry device.

   If the applications do not match those that are defined in the software configuration (for example, an earlier version of an application is installed on the BlackBerry device), the BlackBerry device requests the required updates from the BlackBerry Policy Service.
7. The BlackBerry Policy Service receives the request and sends the applications to the BlackBerry Dispatcher.
8. The BlackBerry Dispatcher compresses the data, encrypts it with the master encryption key of the BlackBerry device, and sends it to the BlackBerry Router.
9. The BlackBerry Router sends the application data to the wireless network over port 3101, which verifies that the PIN belongs to a valid BlackBerry device that is registered with the wireless network.
10. The BlackBerry device decrypts and decompresses the application data, and installs the BlackBerry Java Application.

    The BlackBerry Java Application appears on the home screen of the BlackBerry device, or it appears in the list of installed applications on the BlackBerry device.

Glossary 5

AES
Advanced Encryption Standard

AJAX
Asynchronous JavaScript® and XML

API
application programming interface

ASCII
American Standard Code for Information Interchange

BlackBerry Domain
A BlackBerry Domain consists of the BlackBerry Configuration Database with its users and any BlackBerry® Enterprise Server instances that connect to it.

BlackBerry MDS
BlackBerry® Mobile Data System

CBC
cipher block chaining

CMIME
Compressed Multipurpose Internet Mail Extensions

DES
Data Encryption Standard

DOM
Document Object Model

DRM
Digital Rights Management

ECC
Elliptic Curve Cryptography

GAL
Global Address List

GME

The gateway message envelope (GME) protocol is a Research In Motion proprietary protocol that allows the transfer of compressed and encrypted data between the wireless network and BlackBerry devices. The protocol defines a routing layer that specifies the types of message contents allowed and the addressing information for the data. Gateways and routing components use this information to identify the type and source of the BlackBerry device data, and the appropriate destination service to route the data to.

HTTP
Hypertext Transfer Protocol

HTTPS
Hypertext Transfer Protocol over Secure Sockets Layer

Java ME
Java® Platform, Micro Edition

JSON
JavaScript® Object Notation

LTPA
Lightweight Third-Party Authentication

messaging server
A messaging server sends and processes messages and provides collaboration services, such as updating and communicating calendar and address book information.

MIME
Multipurpose Internet Mail Extensions

MSMQ
Microsoft® Message Queuing

MTLS
Mutual Transport Layer Security

NTLM
NT LAN Manager

PAC
proxy auto-configuration

PIN
personal identification number

PKI
Public Key Infrastructure

RTC
real-time communications

SIM
Subscriber Identity Module

S/MIME
Secure Multipurpose Internet Mail Extensions

SRP
Server Routing Protocol

SSL
Secure Sockets Layer

TCP
Transmission Control Protocol

TCP/IP
Transmission Control Protocol/Internet Protocol (TCP/IP) is a set of communication protocols that is used to transmit data over networks, such as the Internet.

TLS
Transport Layer Security

Triple DES
Triple Data Encryption Standard

UCS
Universal Content Stream

VPN
virtual private network

XML
Extensible Markup Language

XMPP
Extensible Messaging and Presence Protocol

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